



EVROPSKÁ UNIE  
EVROPSKÝ FOND PRO REGIONÁLNÍ ROZVOJ  
INVESTICE DO VAŠÍ BUDOUCNOSTI



In Prague, 11 March 2010  
Ref. no. 79/2010

Subject: **Call for tenders**

We are sending you a call for tenders for a small-scale procurement. The subject matter of the procurement is:

**“Numerical assessment of shielding of laser-generated radiation and particle sources at ELI”**

as part of the “Research and Development for Innovations” Operational Programme (hereinafter referred to as “R&DI OP”).

The financial means for this project shall be claimed from the “Research and Development for Innovations” Operational Programme (Priority Axis 1 - “PA1”).

**I. Identification data of the Contracting Authority:**

Name: Fyzikální ústav AV ČR, v. v. i.  
Registered office: Na Slovance 2, 182 21 Praha 8  
Identification number: 68378271  
VAT number: CZ68378271  
Name and surname of the person entitled to act on behalf of the Contracting Authority:  
Doc. Jan Řídký, CSc. – director, or represented by statutory representative prof. RNDr. Václav Janiš, DrSc  
Contact person: Mgr. Petra Koutná Dušková, Mgr. Zdislava Lojdová  
Telephone: 266052885, 266052207  
E-mail: [duskovap@fzu.cz](mailto:duskovap@fzu.cz), [lojdova@fzu.cz](mailto:lojdova@fzu.cz)

(hereinafter referred to as the “**Contracting Authority**”)

**II. Name and description of the procurement:**

2.1. Name of the procurement:

**“Numerical assessment of shielding of laser-generated radiation and particle sources at ELI”**

2.2. Project description:

The Contracting Authority has been authorised to manage the implementation of the project of

the International Laser Research Centre ELI (Extreme Light Infrastructure) in the Czech Republic (hereinafter referred to as “ELI Project”).

The ELI Project is one of the projects planned within the “ESFRI Roadmap”.

The main aim of the ELI Project is to create a modern facility and to implement a number of research and application projects focused on laser-matter interaction at a level of radiation intensity 100 times higher than the intensity reached by today’s lasers.

### 2.3. Description of the activities demanded by the Contracting Authority:

This call for tenders has been published in order to conclude a contract for work and/or a contract for the provision of services with one Tenderer (hereinafter referred to as the “Tenderer” and the “Economic Operator”) which shall bind the Tenderer to perform the following tasks for the Contracting Authority:

- a) To carry out an assessment of the local shielding, including beam dumps, for the 6 specified laser-generated sources located at specific experimental areas of the designed ELI facility, according to specifications in Annex 1. Consider materials and thickness requirements to adequately shield the primary and secondary radiation around the target areas.
- b) To carry out an activation and sensitivity study of various shield materials and decay dose rates in support of lock-out of the experimental facilities and personnel re-entry scenarios.
- c) To conduct an assessment of the bulk shielding of walls and floors around the specific target areas, including the necessary thickness of the walls, to reduce the radiation intensity at the adjacent areas to acceptable levels.
- d) To investigate the shielding provisions around doors providing access to the concerned experimental areas, design arrangements for reduction of dose rate at the adjacent areas to acceptable levels.
- e) To carry out a dose uptake assessment of the ELI personnel within the experimental areas according to occupancy data provided by the client, optimize shielding provisions within the ELI facility to ensure acceptable doses to ELI personnel,  
everything after previous instruction of the Contracting Authority

Contact between the Contracting Authority and the Tenderer shall be made in person, by e-mail and telephone, and also meetings shall be needed to take over and specify the documentation.

### **III. Time and place of performance of procurement**

The place of the performance of the procurement is the registered office of the Contracting Authority and any other places necessary for the performance of the procurement.

The period of the provision of services lasts until 30 September 2010.

#### IV. Estimated value of the procurement

The estimated value of the procurement shall not exceed 1,200,000 CZK (one million two hundred thousand Czech Crowns), excluding VAT. It is not an award procedure under Act no. 137/2006 Coll., Act on Public Contracts, as amended.

#### V. Qualification prerequisites

The Economic Operator shall submit the originals or officially verified copies of the evidence demonstrating the fulfilment of the qualification prerequisites.

5.1. The Economic Operator's tender must demonstrate the fulfilment of the **basic qualification prerequisites**. The basic qualification requirements are fulfilled by an Economic Operator who:

- a) has not been definitively convicted of a criminal offence committed for the benefit of an organized crime group, of a criminal offence involving participation in an organized crime group, legalisation of the proceeds of criminal activity, complicity, accepting bribes, bribery, indirect bribery, fraud, loan fraud, including the cases of preparation for and attempts to accessoryship in such a criminal offence, or if the conviction upon committing such a criminal offence has been expunged; this prerequisite shall be met by the statutory body or by each member of the statutory body in the case of a legal person and, in the case in which a legal person acts as a statutory body or a member of the statutory body of an economic operator, this prerequisite shall be met by the statutory body or by each member of the statutory body of such a legal person; if a tender or request to participate is submitted by a foreign legal person by means of its organisational branch, the prerequisite pursuant to this subparagraph shall also be met, as well as the stated persons, by the head of the organisational branch; such a basic qualification prerequisite shall be met by the Economic Operator both in relation to the territory of the Czech Republic and to the country of the registered office, place of business or residence thereof,
- b) has not been definitively convicted of a criminal offence in which the facts of the case are related to the object of the business activities of the economic operator under separate legal regulations or in which the conviction upon committing such a criminal offence has been expunged; this condition shall be met by the statutory body or by each member of the statutory body in the case of legal person, and in the case in which a legal person acts as a statutory body or a member of the statutory body of an economic operator, this prerequisite shall be met by the statutory body or by each member of the statutory body of such a legal person; if a tender or request to participate is submitted by a foreign legal person by means of its organisational branch, the prerequisite pursuant to this subparagraph shall also be met, as well as the stated persons, by the head of the organisational branch; such a basic qualifications prerequisite shall be met by the Economic Operator both in relation to the territory of the Czech Republic and to the country of the registered office, place of business or residence thereof,
- c) has not accomplished elements of unfair competition practices in the form of bribery under a separate legal regulation,
- d) is not or has not been subject to insolvency proceedings involving its assets, in which the declaration of bankruptcy has been issued or an insolvency petition has not been rejected due to a lack of assets on the part of the economic operator to cover the costs of insolvency proceedings, or the declaration of bankruptcy has not been set aside because of the economic

- operator's insufficient property or in respect of which the receivership has been imposed under a separate legal regulation,
- e) is not being wound up,
  - f) has no outstanding tax arrears registered in tax records, either in the Czech Republic or in the country of the registered office, place of business or residence of an economic operator,
  - g) has no outstanding arrears in respect of payments and penalties of public health insurance, either in the Czech Republic or in the country of the registered office, place of business or residence of an economic operator,
  - h) has no outstanding arrears in respect of payments and penalties of the social security insurance and contribution to the State employment policy, either in the Czech Republic or in the country of the registered office, place of business or residence of an economic operator,
  - i) has not been found guilty of grave professional misconduct in the 3 preceding years or has not been given a disciplinary punishment under separate legal regulations, in which the demonstration of professional qualifications under separate legal regulations is required pursuant to § 54(d); when the economic operator pursues such an activity through a person in authority or any other person liable for the activity of an economic operator, this prerequisite shall be applicable to those persons, and
  - j) is not enrolled on the black list of economic operators banned from participating in the performance of public contracts.

The Economic Operator shall demonstrate the fulfilment of basic qualification prerequisites by supplying:

- a) an extract from the Penal Register for items 5.1 a) and b) of the tender documentation. In the case of a legal person, the Economic Operator shall provide an extract from the Penal Register for the statutory body or for each member of the statutory body. If a tender is submitted by a foreign legal person by means of its organisational branch, the Economic Operator shall provide extracts from the Penal Register for the head of the organisational branch, as well as for the statutory body or all members of the statutory body of the foreign legal person. The extract shall not be dated more than 90 days from the deadline for tender submissions.
- b) a statement by the relevant Tax Authority and a solemn declaration as regards the excise tax for item 5.1 f) of the tender documentation. The statement and the declaration shall not be dated more than 90 days from the deadline for tender submissions.
- c) a statement by the relevant authority or institution for item 5.1 h) of the tender documentation. The statement shall not be dated more than 90 days from the deadline for tender submissions.
- d) a solemn declaration for items 5.1 c), d), e), g), i) and j) of the tender documentation; the Economic Operator shall use the declaration in Appendix 2 of the tender documentation.

5.2. The Economic Operator shall demonstrate in the tender the fulfilment of **professional qualification prerequisites**. The fulfilment of the professional qualification prerequisites is demonstrated by an Economic Operator, who shall submit

- a) an extract from the Commercial Register, if it is contained therein, or an extract from any other analogous register, if it is contained therein,

- b) evidence of possession of a licence to pursue business activities under separate legal regulations to the extent corresponding to the subject matter of the public contract.

5.3. The Economic Operator shall demonstrate in the tender the fulfilment of **further qualification prerequisites** by supplying:

- a) A list of 2 major contracts performed in the past 3 years, confirmed by a solemn declaration including i) the name of the contracting entity ii) the name of the project the services were provided for iii) a relevant description of the subject matter and scope of the services provided. A major contract may be considered as providing services similar to this tender, namely in the field of shielding and radiological safety in the medical and nuclear industries.
- b) A list of the members of the Tenderer's team which shall perform the contract. The Tenderer is required to have a working team of at least 3 persons performing the public contract, regardless of whether these persons are employees of the Tenderer or whether they are in a different relation to the Tenderer. The Tenderer shall demonstrate the fulfilment of this qualification prerequisite by submitting a list of the members of the team set up by the Tenderer to perform the public contract and by submitting a well-structured curriculum vitae of each team member, with each curriculum vitae signed by the given member. The Tenderer shall indicate the relation between each team member and the Tenderer.

The professional curricula vitae of all the team members shall include at least the following required data:

- i) name and surname of the expert;
- ii) educational achievement;
- iii) overall length of working experience and length of experience in a field relevant to the position held under the contract (number of years);
- iv) an overview of professional experience relevant to the position held under the contract, including a brief description of activities and major projects the person participated in
- v) education certificate (university diploma)
- vi) date and personal signature of the expert

The Contracting Authority requires that the professional curricula vitae prove that at least 3 members of the Tenderer's team have a university degree in a technical area of study with focus on mathematical analyse. The Tenderer shall submit a verified copy of the university degrees of these persons. The Contracting Authority also requires that the Tenderer's team leading researcher has at least 10 years experience in above mentioned field and in the field of shielding and radiological safety in the medical and nuclear industries. In the case that the Tenderer shall be a company, the requirement of the Contracting Authority is that the experience of this company in the field of shielding and radiological safety in the medical and nuclear industries is at least 10 years.

The Contracting Authority also requires that the Tenderer has experience with radiation transport numerical codes including MNCP, Stilla, FLUKA, or others, and the detailed understanding of EU regulations governing the use of ionizing radiation. These last two requests of Contracting Authority the Tenderer has to prove by a solemn declaration.

- c) The quality system certificate according to Czech technical standards ČNS EN ISO 9001 for activities comparable with deliverables under this tender, or the comparable certificate under the rules of EU.

5.4. Evidence demonstrating the fulfilment of the basic qualification prerequisites and the extract from the Commercial Register shall not date more than 90 calendar days from the last day on which the fulfilment of qualifications is to be demonstrated.

5.5. The Tenderer shall make a written statement to confirm that all the data in the tender is true and that the Tenderer has not withheld any relevant facts concerning the Tenderer's capacity to perform the contract and is prepared to fulfil the conditions of the contract in a reliable manner and without delay.

## **VI. Calculation of the tender price and payment conditions**

6.1. The tender price shall be quoted in Czech Crowns (CZK), separately excluding VAT, including VAT, and as a total price including VAT. The Tenderer is required to specify the tender prices for individual parts of the work as divided in Section II, Article 2.3 a) to e) of this call for tenders, and also this individual parts of work divide into assumed men/hours with the rate of one hour.

The Contracting Authority requires having the total price for the complete supply specified in the tender.

The tender price shall include all the relevant costs on the part of the Tenderer which are necessary for the performance of the public procurement.

The billing address is the address of the Contracting Authority:  
Fyzikální ústav AV ČR, v. v. i., Na Slovance 2, 182 21 Praha 8.

6.2. The total agreed work price shall be paid to the Tenderer in Czech Koruna.

The Tenderer shall be entitled to invoice the Contracting Authority 30% of the total agreed work price after the signature of the relevant contract between the Contracting Authority and the Tenderer, 40% of the total agreed work price after delivery of at least three parts of the work as described in Art. II Sec. 2.3 of this call for tenders to the Contracting Authority, and the last 30% of the total agreed work price after the date when the whole work defined in Art. II, Sec. 2.3., letter a) to e) shall be delivered to the Contracting authority.

The due date of the invoices is thirty (30) days from a date of their delivery to the Contracting Authority.

## **VII. Deadline and place of tender submissions:**

7.1. The tender shall be delivered by post or in person to the address of the registered office of

the Contracting Authority. **The deadline for submissions is scheduled for 29<sup>th</sup> March 2010 9.00 a.m.** The moment when the tender is received by the Contracting Authority is deemed as the moment of submission.

7.2. The envelope containing the tender shall be properly sealed, bearing the address of the Tenderer, and the name of the procurement shall be written on it visibly:

**“Veřejná zakázka (The public tender) - Numerical assessment of shielding of laser-generated radiation and particle sources at ELI” “- NEOTEVÍRAT (DON'T OPEN).**

7.3. The tender shall contain all the identification data of the Tenderer, in particular: the business name, the address of the registered office, the identification number, the person entitled to act on behalf of the Tenderer or, if necessary, the person authorized to represent the Tenderer and the contact address for written correspondence between the Tenderer and the Contracting Authority.

7.4. The tender shall be written in Czech or English and shall include a draft contract signed by a person authorized to act on behalf of the Tenderer or in the Tenderer's name.

7.5. The tender shall include a declaration signed by the person authorized to act on behalf of the Tenderer or in the Tenderer's name confirming that the Tenderer is bound by the entire contents of the tender for the 60 days following the deadline for tender submissions.

7.6. The Tenderer shall submit the tender in duplicate, marked “Original” and “Copy” respectively. All sheets shall be firmly connected or stapled to prevent any sheet from being removed from the tender. All printouts shall be duly legible and the text shall not contain items crossed out or overwritten.

7.7. All the pages of the tender, or all the pages of the individual printouts, shall be numbered in continuous ascending order.

7.8. The Tenderer shall also submit the tender in electronic form on a CD in a MS Office format or compatible or as a PDF file (this does not apply to evidence demonstrating the fulfilment of qualification prerequisites).

7.9. The tender shall be structured as follows:

- a) Cover sheet of the tender  
The cover sheet shall include the following information: the name of the procurement, the basic identification data of the Contracting Authority and the Tenderer (including the persons authorized to act), contact information (contact person for the given procurement, telephone number, e-mail etc.), the tender price not exceeding the estimated contract value, structured and quoted according to the tender documentation and the date and signature of the person entitled to act on behalf of the Tenderer (use **Appendix 1** of this call for tenders)
- b) evidence demonstrating the fulfilment of the qualification prerequisites under Section V, - in the case of the solemn declaration under Article 5.1 c), d), e), f), g), i) and j), the Tenderer shall use **Appendix 2,**

- c) a draft contract signed by the person entitled to act on behalf of the Tenderer or in the Tenderer's name,
- d) a declaration confirming the tender as correct and binding, signed by the person entitled to act on behalf of the Tenderer or in the Tenderer's name.

### VIII. Award period

The period throughout which the Tenderers are bound by their tender expires on 28<sup>th</sup> May. The award period shall run from the date of expiry of the time limit for the submission of tenders and cease to run on the date of delivery of the notice by the Contracting Authority of the selection of the most suitable tender. The award period shall be extended in respect of the Tenderers that the Contracting Authority is entitled to conclude a contract with in compliance with this Act, until the conclusion of a contract or until the setting aside of the award procedure.

### IX. Tender Evaluation Criteria

9.1 The tenders shall be evaluated by their economic advantageousness. The evaluation shall be carried out according to partial evaluation criteria and their relative weighting:

9.2 Partial evaluation criterion:	relative weighting
a. tender price	60 %
b. the date of delivery of the individual parts of the work as structured in Art. 2 Sec. 2.3, letter a) to e) of this call for tenders	40 %

Data for partial evaluation criteria and the means of evaluation:

To tender price - The overall price in CZK exclude VAT is being evaluated.

To the date of delivery of the individual parts of the work as structured in Art. 2 Sec. 2.3, letter a) to e) of this call for tenders. The Tenderer is obliged to state for the reasons of this evaluations criterion in the draft of the contract the date to which he undertakes to deliver the parts of the work as structured in Art. 2 Sec. 2.3, letter a) to e) of this call for tenders to the Contracting Authority. The maximum number of points with which the Contracting Authority will evaluate each of the five parts as structured in Art. 2 Sec. 2.3, letter a) to e) of this call for tender is 20 points and the highest numbers of points will receive the offer with the earliest date of delivery (maximum for this criterion is 100 points).

The Tenderer is obliged to take into account in the draft of the contract the condition, that all parts of the work as structured in Art. 2 Sec. 2.3, letter a) to e) of this call for tender must be delivered to the Contracting Authority on 30<sup>th</sup> September 2010.

9.3. The mode of evaluation of offers

The evaluation of offers will be made by point method, where each individual offer will receive in the frame of each criterion the value of points, which reflects the success of the offer in the frame of the criterion. Individual point values according to partial criteria will be multiplied by relative weight of the specific criterion. The sum of weighted point values of each offer will set



order of results so that the most successful is the offer which received the highest sum of point values.

**X. Business terms:**

The Contracting Authority lays down the following basic business terms which shall be incorporated by the Tenderer into the draft contract on provision of services:

The contract shall fulfil all the requirements of the Ministry of Education, Youth and Sports for the projects of the R&DI OP (PA1) as mentioned below – items d) to g) and i).

- a) The draft contract shall not contradict or in essential way restrict the Contracting Authority's rights or requirements specified in this documentation.
- b) The draft contract shall be signed for the Tenderer by a person entitled to act or by an attorney. In such cases, the original or an officially verified copy of the authorisation document shall be included in the draft contract.
- c) The draft contract shall bind the Tenderer to perform the contract according to Article II Sec. 2.3 of this call for tenders divided as follows: a) the part of work as defined in Section II article 2.3.letter a) by the end of \_\_ 2010, b) the part of work as defined in Section II article 2.3.letter b) by the end of \_\_ 2010, c) the part of work as defined in Section II article 2.3.letter c) by the end of \_\_ 2010, d) the part of work as defined in Section II article 2.3.letter e) by the end of \_\_\_\_ 2010, e) the part of work as defined in Section II article 2.3.letter e) by the \_\_\_\_ 2010. (see Art. 9 Sec. 9.2)
- d) In the draft contract, the Tenderer shall agree to be subjected to audits by the Management Body of the R&DI OP, the European Court of Auditors, the European Commission, the Supreme Audit Office of the Czech Republic, auditing bodies, authorized auditing entities, local tax authorities, the Payment and Certification Body and other auditors under the law of the Czech Republic and EC. The Tenderer shall also agree to facilitate a full audit of the progress of the implementation of the project and of the Tenderer's accounting, as laid down by Act no. 320/2001 Coll., Act on Financial Control, and by Act no. 552/1991 Coll., Act on State Control, as amended. If an audit authority ascertains shortcomings, the Tenderer shall, without undue delay, or, at the latest by the date set out by the audit authority, take measures to rectify the shortcomings and notify the respective audit authority of the rectification within the time limit which has been laid down by the authority.
- e) The Tenderer shall keep all documentation relating to the execution of the contract for ten (10) years following the year in which the last payment under this contract was made and, at the same time, at least for a period of three (3) years after the expiry of the Operation Programme "Research and Development for Innovations" (scheduled expiry in 2020).
- f) In compliance with the regulations of the Ministry of Education, Youth and Sports for the projects of the PA1 R&DI OP, the Tenderer shall ensure full cooperation in the monitoring of the project throughout the entire process of its implementation and upon its completion. This applies in particular to all required data and to information about the implementation of the project.

- i) The Tenderer shall indicate in the draft contract that the Contracting Authority has the right to withdraw from the contract, should the costs which may arise from the contract for the Contracting Authority are found to be inadequate by the Management Body of the R&DI OP or by another auditing authority.
- j) The Tenderer shall indicate in the draft contract that failure by the Tenderer to meet agreed deadlines shall result in a contractual fine of 2500 CZK, due to be paid to the Contracting Authority for every day the Tenderer is in default of fulfilling his commitments.
- k) The Contracting Authority shall have the right to unilaterally establish any contractual fine against any claim the Tenderer may have against the Contracting Authority.
- l) The payment of a contractual fine shall not in any way affect the right of the Contracting Authority to claim potential damages, including claims for loss of profit in the event of default of providing services, and claims for damages shall not be limited to the amount of the contractual fine.
- m) The price and payment conditions in the draft contract or contracts shall comply with the requirements of Art. 6 Sec. 6.2 of this call for tenders.
- n) Regulations of the contract which are not stipulated by these business terms shall be governed by Act no. 513/1991 Coll., Commercial Code, as amended.
- o) Potential disputes between the Contracting Authority and the Tenderer shall be decided upon by the court which has jurisdiction in the place of the registered office of the Contracting Authority. Arbitration proceedings shall not be applied.

**XI. Other information:**

- 1. The Contracting Authority has the right to reduce the extent of the procurement without giving any reason, or cancel this selection procedure.
- 2. The chosen Tenderer shall be called upon to conclude the contract.

Fyzikální ústav AV ČR, v. v. i.,

doc. Jan Řídký, CSc.  
Director



# Cover Sheet of the Tender

**Basic data:**

**Name of public contract:** .....

**Contracting Authority:** **Fyzikální ústav AV ČR, v. v. i.**

**Registered office:** Na Slovance 2, 182 21 Praha 8

**Identification number:** 68378271

**Person entitled to act on behalf of the Contracting**

**Authority:** doc. Jan Řídký, CSc., director

**Contact person:** Mgr. Petra Koutná Dušková

**Telephone:** 266 052 885

**Fax:** 286 890 265

**E-mail:** [duskovap@fzu.cz](mailto:duskovap@fzu.cz)

**Tenderer:** .....

**Registered office:** .....

**Identification number:** .....

**VAT number:** .....

**Person entitled to act on behalf of the Tenderer:**

**Bank connection:** .....

**Persons authorized to represent:** .....

**Contact person:** .....

**Contact address:** .....

**Tel.:** .....

**E-mail:** .....

**Tender price:**

**Total price excluding VAT:** .....

**Total price including VAT:** .....

.....  
Business name – person entitled to act for the Tenderer

(to be filled in by the Tenderer)

# Solemn declaration

under Act no. 137/2006 Coll., Act on Public Contracts (hereinafter referred to as "Act")

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I hereby solemnly declare that:

- under § 53 (1) (c) of the Act - the Economic Operator has not accomplished elements of unfair competition practices in the form of bribery under § 49 of the Commercial Code
- under § 53 (1) (d) of the Act - the Economic Operator is not or has not been subject to insolvency proceedings involving its assets, in which the declaration of bankruptcy has been issued or insolvency petition has not been rejected due to lack of assets on the part of the Economic Operator to cover the costs of insolvency proceedings, or the declaration of bankruptcy has not been set aside because of the Economic Operator's insufficient property or in respect of which the receivership has been imposed on under separate legal regulation
- under § 53 (1) (e) of the Act - the Economic Operator is not being wound up
- under § 53 (1) (f) of the Act - the Economic Operator has no outstanding tax arrears registered in tax records, both in the Czech Republic and in the country of the registered office, place of business or residence of an Economic Operator,
- under § 53 (1) (g) of the Act - the Economic Operator has no outstanding arrears in respect of payments and penalties of public health insurance, both in the Czech Republic and in the country of the registered office, place of business or residence of an Economic Operator,
- under § 53 (1) (i) of the Act - the Economic Operator has not been found guilty for grave professional misconduct in the preceding 3 years or has not been imposed a disciplinary punishment under separate legal regulations, where demonstration of professional qualifications under separate legal regulations is required pursuant to § 54(d); this prerequisite is fulfilled also by the person in authority and other persons liable for the activity of the Economic Operator,

under § 53 (1) (j) of the Act

- the Economic Operator does not appear on the black list of Economic Operators banned to participate in the performance of public contracts.

place..... date.....

.....

Business name – person entitled to act for the Tenderer

(to be filled in by the Tenderer)

## Annex A

### Numerical assessment of shielding of laser-generated radiation and particle sources at ELI

The radiation and particle sources that will be generated by interaction of high-intensity laser pulses with matter at the ELI facility are represented in Figure 1. All these sources of electrons, protons and gamma radiation will be located in the underground floor of the ELI laser facility. The indicated parameters of the sources refer to maximum values potentially attainable at the ELI facility.



Figure 1. Diagram showing source localizations and directions within the underground floor of the ELI laser building.

#### 1. Electron sources

Near monochromatic bunches of electrons are generated by interaction of laser pulses with gas targets:

- 10 GeV, 6 nC, divergence angle <1 degree, frequency 10 Hz
- 50 GeV, 3.5 nC, divergence angle <1 degree, frequency max 0.1 Hz

#### 2. Proton sources

Near monochromatic bunches of protons are generated by interaction of laser pulses with solid targets.

- 100 MeV,  $5 \times 10^{13}$ /sr/MeV, divergence angle 40 degrees, frequency 10 Hz
- 1 GeV,  $10^8$ /sr/MeV, divergence angle 40 degrees, frequency 10 Hz
- 5 GeV,  $5 \times 10^7$ /sr/MeV, divergence angle 40 degrees, frequency max. 0.1 Hz

#### 3. Gamma rays

- 1-30 MeV, 2.4 Sv @ 1m, isotropic into  $4\pi$ , frequency max. 0.1 Hz