

# společný seminář odd. 26 a 27

*Fyzikální ústav AVČR, Cukrovarnická 10, Praha 6*

*datum: 11. 11. 2016 pátek*

*čas: 10:00*

*mítnost: knihovna, budova A, 1.p.*

## TÉMA

### **Advances in Silicon Heterojunction Solar Cell Research**

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In this presentation we discuss recent developments in the field of silicon heterojunction solar cells. This technology is a prime example of so-called passivating contacts. Such contacts passivate the silicon surface states and collect one carrier type, while blocking the opposite type. Here, we specifically discuss three different strategies to improve the optical response of silicon heterojunction devices. First, doped amorphous silicon layers at the front can be replaced by highly transparent transition metal oxides for carrier collection. By using molybdenum oxide as a hole collector, we recently obtained an independently confirmed efficiency of 22.5%. Secondly, silicon heterojunction contacts can be applied in an interdigitated back contacted architecture. With simple, lithography-free processing, we demonstrated recently devices with efficiencies above 22.5%. Finally, silicon heterojunction solar cells have an excellent red response, making them ideal candidates as bottom cells in a tandem configuration. Particularly attractive top-cell partners are thin-film perovskite solar cells. We discuss opportunities and challenges in the fabrication of such tandem devices. Exploiting such materials, we anticipate that, providing that stability issues are solved, silicon-based photovoltaic modules with efficiencies approaching 30% can one day be a reality.

odborný garant: *RNDr. Antonín Fejfar, CSc.*