*Title:*

**Spectrum of a rectangular lattice with the vertex coupling non-invariant with respect to time inversion**

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*Abstract:*    A periodic rectangular lattice quantum graph with non time-reversal coupling at the vertices will be introduced. The structure of so called band-gap spectrum of this system will be discussed. Numerical solutions of the spectrum will be shown at the end.

*Key words:*   Quantum graph, vertex coupling, preferred orientation, rectangular lattice, band-gap spectrum.