Project title:	**Silicene on metallic quantum wells**
Principal investigator:	dr hab. Mariusz Krawiec
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Research project hypothesis and objectives

The project aims to combine the ultimate two-dimensional material – silicene, and quasi two-dimensional metal - quantum well, in a system with the electronic properties governed by atomic interaction between the silicene and quantum well, and by the electronic structure of the quantum well. Such interaction can be manipulated by an appropriate choice of the adjacent quantum well and should allow to tune the silicene electronic properties.

> *The metallic quantum well as a substrate seems to be exceptional well suited to tune the electronic structure of silicene and hence, to control the hybridization of the p and p* bands of silicene. We expect that varying the QW thickness, and thus the QW energy level positions, an alteration of the hybridization will be achieved. Since the quantum level energy is established primarily by the ultrathin film thickness, and not by the crystal structure, the effect will be easily realized experimentally and may be described theoretically as well.*

The interaction between silicene and substrate is of prime importance, since on the one hand it is responsible for buckling of the silicene, and on the other hand determines the electronic properties. We propose metallic quantum well as a tool of tuning the electronic structure of silicene.

> *Our project focuses at the most important feature of the novel material – controling the band gap without degrading the high carrier mobility which is vital for silicene (as for graphene) to its application in future nanoelectronics.*