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University St. 0143TBILISI, Rep.of GEORGIA, 0143 TBILISI, Rep of Georgia. *On the Quantum
Billiard in the Hexagonal Type Areas*. Preliminary report.

In the paper quantum billiard in the hexagonal type areas such as hexagon with the hexagonal hall, hexagonal rug, hexagonal flower and hexagonal prismoid is studied. The process is described by the Helmholtz Equation with the homogeneous boundary condition. The problem is investigated by means of the conformal mapping and partial differential equation. The Helmholtz Equation is transformed to the equation of the elliptic type. One parameter of the mapping is chosen sufficiently small, the initial equation is simplified and replaced by the approximate elliptic equation in the rectangle with the homogeneous boundary conditions. The asymptotic solutions of this equation are obtained. The spectrum and the corresponding eigenfunctions are found near the boundary of the rectangle. The wave functions are found in terms of the Bessel's functions. The results are applied for the estimation of the energy levels of electrons in graphene. (Received September 08, 2014)