# Engineering the band structure of a Hg1−x(Cd|Mn)xTe with x-Cd or x-Mncomponent based two- and three-dimensional topological insulator

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Since the HgTe materials were discovery as a material with topological insulator properties in two cases: so called three dimensional (3D) as well as two dimensional (2D) topological insulator (for 75nm wide and about 6.4nm wide QW HgTe films respectively for 3D ant 2D cases) many papers were devoted investigation concerning the electronics, optics and many other different properties such structures. All of this activity, beside from the pure science pointof view, were caused to know better the properties from the point of view of the possible applications region forsuch new state of mater based on HgTe compounds. In this papers however we present the properties much morecomplex structures like A1−xBxC solid solutions based on HgTe (A and C) materials with different then 0 x- Cd and Mn compounds (B - part in the Hg1−xBxTe). Beside the differences caused by influence Cd and Mn compound into the HgTe materials the additional physical, structural and geometry factors are taking into account from the point of view of the possible properties such modified HgTe-based compounds. To show how all of these properties can by changed for such complex structures comparing with the HgTe pure materials we all our investigation presents here is flowed on the based on very well know theoretical eight band kp model which is a key to understand all of the electronic, optics and many diffident properties flowing from this state of maters. Additional magnetic field and Landau levels spectroscopy can give the information about quality of the TI states for investigated Hg1−xBxTe solid solutions. Together with the physical and external conditions such as bulk inversion asymmetry (BIA), structural inversion asymmetry (SIA) and Interface inversion asymmetry (IIA) which plays critical role in the TI cases the band structure modification are also taking into account in presented paper from the point of view the modifications parameters comparing to that obtained for 3D as well as 2D materials pure HgTe films.