

Ultra-high energy particle collisions in strong gravitational field and super-Penrose process

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A brief review of the effect of acceleration of particles to unbounded energies in their centre of mass frame due to collision is suggested. The main emphasis is made on the properties of debris after collision that can be observed at infinity. When collision occurs near a black hole, the efficiency of the process is limited. However, near singularities an unbounded efficiency (the so-called super-Penrose process) becomes possible. Consideration applies to a wide class of axially symmetric stationary rotating spacetimes. The possible role of the magnetic and scalar fields is discussed.