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Coulomb interaction effect in tilted Weyl fermion in two dimensions HIROKI ISOBE, Massachusetts Institute of Technology, NAOTO NAGAOSA, RIKEN and University of Tokyo — Weyl fermions with tilted linear dispersions characterized by several different velocities appear in some systems including the quasi-two-dimensional organic semiconductor α-(BEDT-TTF)$_2$I$_3$ and three-dimensional WTe_2. The Coulomb interaction between electrons modifies the velocities in an essential way in the low energy limit, where the logarithmic corrections dominate. Taking into account the coupling to both the transverse and longitudinal electromagnetic fields, we derive the renormalization group equations for the velocities of the tilted Weyl fermions in two dimensions, and found that they increase as the energy decreases and eventually hit the velocity of light c to result in the Cherenkov radiation. Especially, the system restores the isotropic Weyl cone even when the bare Weyl cone is strongly tilted and the velocity of electrons becomes negative in certain directions.

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