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Floquet topological phases coupled to environments SZABOLCS VAJNA, Department of Physics, Boston University and Budapest University of Technology and Economics, BARUCH HOROVITZ, Department of Physics, Ben-Gurion University of the Negev — We consider the fate of a helical edge state of a spin Hall insulator and its topological transition in presence of a circularly polarized light when coupled to various forms of environments. A Lindblad type equation is developped to determine the fermion occupation of the Floquet bands. We find that non-secular terms, corresponding to 2-photon transitions lead to a mixing of the band occupations, hence the light induced photocurrent is in general not perfectly quantized, although deviations are small in the adiabatic limit. Sharp crossovers are identified at frequencies Ω and $1/2\ \Omega$ (Ω is the strength of light-matter coupling) with the former corresponding to a phase transition on the level of the 2nd order theory.

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