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**General Relativistic Simulations of Magnetized Plasmas around Black Holes** FATEMEH HOSSEIN-NOURI, Washington State University, SPEC COLLABORATION — Black hole accretion flows and jets are qualitatively affected by the presence of the magnetic fields. We study fully three dimensional simulations of a magnetized thick accretion disk around a spinning black hole perturbed initially by weak poloidal magnetic fields using and developing the general relativistic magnetohydrodynamics (GRMHD) code SpEC. Our goal is to enhance SpEC in order to simulate magnetized binary mergers in the future. We set a number of tests to develop our GRMHD code and we report the current status of testing it in the simulation of a magnetized accretion torus around a black hole. We explore how magnetic fields affect the dynamics of the plasma and the possibility of observing relativistic jets and resolving the magnetorotational instabilities.

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