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Magnetized black holes: the role of rotation, boost, and accretion in twisting the field lines and accelerating particles

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Combined influence of linear boost and rotation of a black hole can distort an ambient magnetic field to the extent that magnetic field lines develop a neutral point, where the magnetic intensity vanishes. This purely geometrical effect interacts with the accretion flow that can carry and distort the frozen-in magnetic lines, too. Near the event horizon, the magnetic null is threaded by a non-vanishing electric component; these are circumstances favourable for acceleration of electrically charged particles. We outline the mechanism which could operate in the magnetosphere of astrophysical black holes that rotate and move through diluted gaseous environment pervaded by an organized (super-horizon scale) magnetic field. This set-up may work as a pre-acceleration agent near the ergospheric boundary (cf. The Astrophysical Journal, Volume 900, id.119, 2020; <https://arxiv.org/abs/2008.04630>).

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