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Oblique magnetic fields and the role of frame dragging

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Magnetic null points can develop near the ergosphere boundary of a rotating black hole by the combined effects of strong gravitational field and the frame-dragging mechanism. The electric component does not vanish in the magnetic null and an efficient process or particle acceleration can occur. The situation is relevant for low-accretion-rate nuclei of some galaxies which exhibit episodic accretion events (such as the Milky Way's supermassive black hole) embedded in magnetic field field of an external origin. We propose that such a situation develops while a magnetized neutron star approaches the supermassive black hole during late stages of its inspiral motion. The field lines of the neutron star dipole thread the black hole's event horizon.

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