Relativistic jet as a result of a magnetic flux tube falling onto a Kerr black hole.

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To describe the behaviour of a test magnetic flux tube near a Kerr black hole we applied method of introducing lagrangian coordinates in relativistic MHD equation in general relativity. It can be shown that a flux tube can be considered as nonlinear string. This description turns out to be convenient for the investigation of accretion of magnetized plasma on a gravitation center. If such a tube/string falls into rotating black hole the leading part of the string is swirled around the event horizon and becomes stretched a lot. It loses angular momentum and energy due to string braking, and after some time energy of this leading part getting negative, however energy of the whole string must be conserved. This implies that the portion of the flux tube with positive energy ends up with the energy greater then the initial tube energy. We illustrate this string variant of the Penrose process of energy extraction from a rotating black hole with numerical simulation. Also we investigated falling flux tubes with different initial directions. We found out that energy extraction mechanism does not depend from the initial magnetic flux configuration.