Maxwell equations in Kerr metric :

$$\nabla \times \vec{H} = \partial_t \vec{D} + 4\pi \vec{J}$$
$$\mathrm{div}\, \vec{D} = 4\pi\rho$$

like an e.m. active medium

with

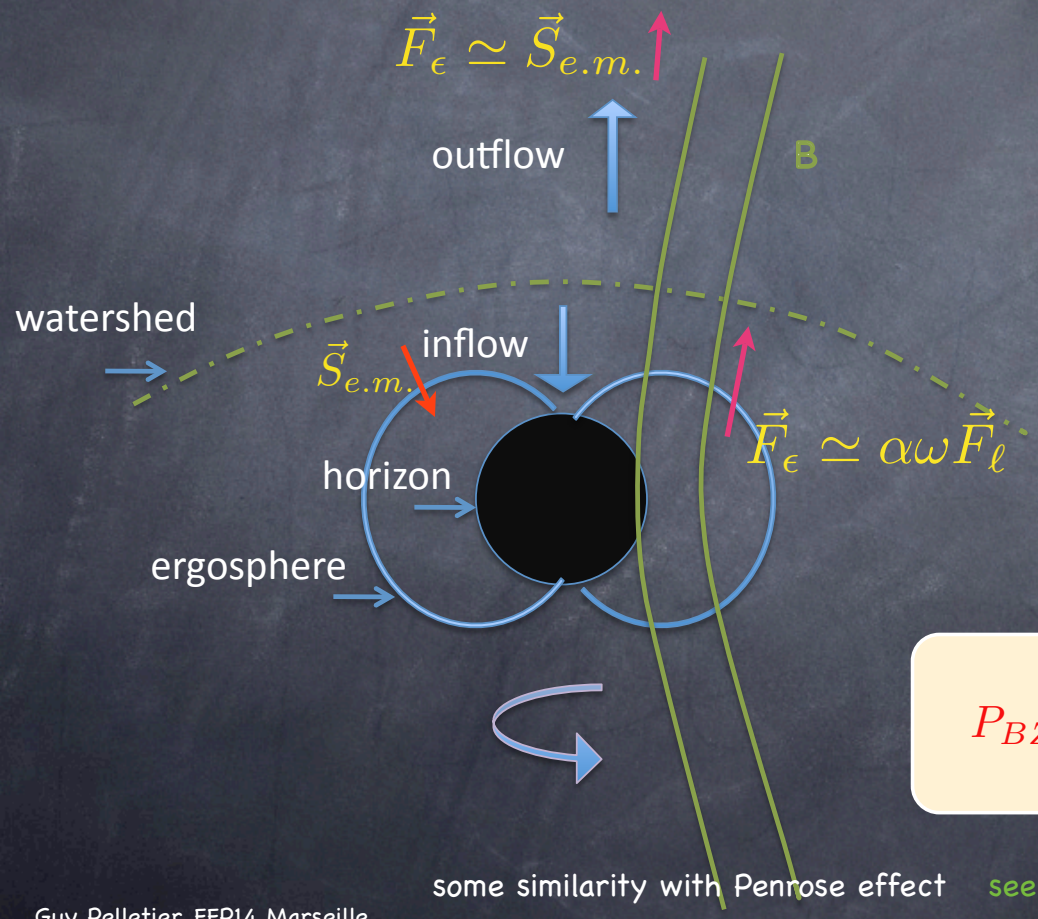
$$\vec{E} = \alpha \vec{D} + \vec{\beta} \times \vec{B}$$
$$\vec{H} = \alpha \vec{B} - \vec{\beta} \times \vec{D}$$

(Komissarov 08)

(in ZAMO frame)

mostly in ergosphere

$\vec{\beta} \times \vec{B}$ generates I



highly magnetized matter => angular momentum:

$$\propto B_\phi \propto I < 0$$

flux of angular m^t

$$\vec{F}_\ell \propto -B_\phi \vec{B}_p$$

total flux of energy

$$\vec{F}_\epsilon = \alpha(\alpha \vec{S}_{e.m.} + \omega \vec{F}_\ell)$$

$$P_{BZ} = a^2 \left(\frac{B_n^2}{10^4 G}\right)^2 \left(\frac{M}{10^8 M_\odot}\right)^2 10^{44} erg/s$$

some similarity with Penrose effect

see (GP 04, Komissarov 06, 08, Lasota et al. 14)