PREDICTED POLARIZATION IN SGR-A* FOR BONDI INFLOW

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ABSTRACT: Black Hole Event Horizon advocate Steven Hawking has recently discussed alternative solutions to the Einstein/Maxwell field equations allowing for a different kind of collapsed object, which admits of a strong surface magnetic field that pervades the inner space of SgrA* at at central radii 2 to 100 Einstein radii (Hawking, 2014,NATURE) A closed set of equations including the quantum electrodynamical repulsive pressure force occurring at the "apparent horizon" has a surface magnetic field of 10^5 Gauss (Robertson & Leiter, 2010). Such fields have been observed to exist from a background pulsar's measured magnetic field Faraday rotation (Eatough et al, 2013). In this presentation I show the expected magnetic field structure predicted to be observed from the Sgr A* rotating magnetic field calculated in the solution describing Sgr A* as a Magnetic Eternally Collapsing Object (MECO).

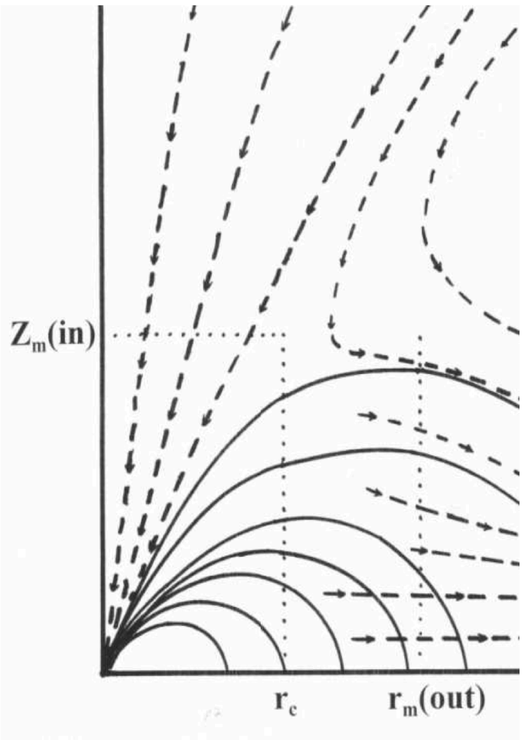
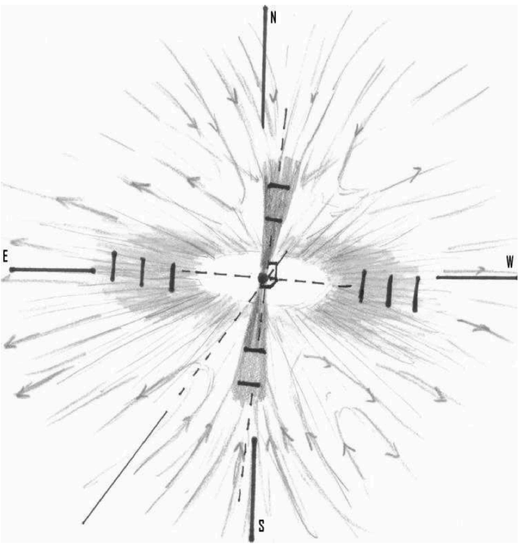


Figure 1. Schematic diagram from Robertson and Leiter (2010) of accretion flow into a rotating magnetic dipole. Solid lines are magnetic field lines. Dashed lines with arrows indicate flow lines. Dotted lines mark the co-rotation radius (Rc) and the magnetosphere radius Zm(in). The part of the flow that reaches the axial Alfven surface at Zm(in) and continues to the MECO surface is approximately conical.



Sketch of predicted Bondi inflow/outflow pattern within the magnetosphere for the MECO model of Sgr A*. Most of the radio spectrum to 10^12 Hz is generated in plasma that outflows in an equatorial disk-like outflow wind. The disc outflow should be limb-bright and beamed generally W-E and E-W as seen against the sky plane. Near-IR emission would be produced in the generally N-S and S-N axial inflows. Polarization directions marked as dark bars are are essentially perpendicular to magnetic field lines. Quiescent X-ray luminosity would be produced throughout the magnetospheric volume. X-ray SSC and thermal brehmsstrahlung radiation would be produced in flares in the axial inflow Near-IR region. The luminosity of the central MECO even at its peak luminosity at 3.2 *um* is below observational limits. (From Robertson & Leiter, 2010)

REFERENCES

Hawking, S. 2014, NATURE,

Robertson, S. & Leiter, D. 2010, Journal of Cosmology, **6**, 1438