

Transonic structure of slowly rotating accretion flows in galaxy centers

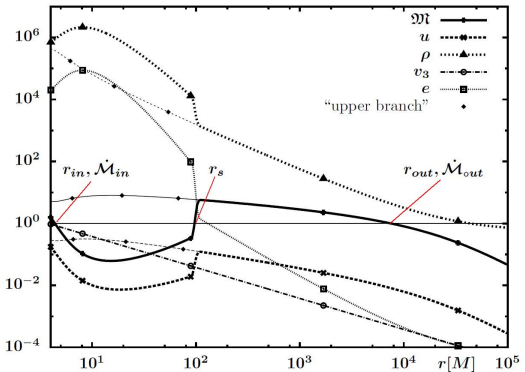
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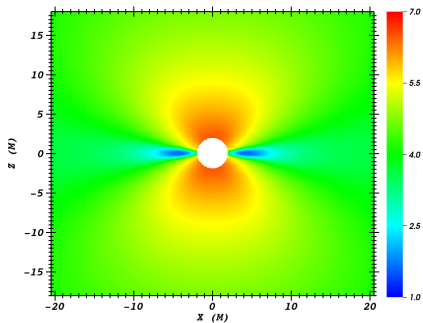
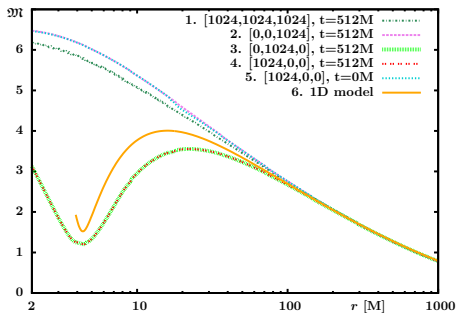
- Study of slowly rotating accretion flows - important for low luminous AGNs or the advective component in microquasars
- Analytical study - pseudo-Newtonian 1D quasispherical flow

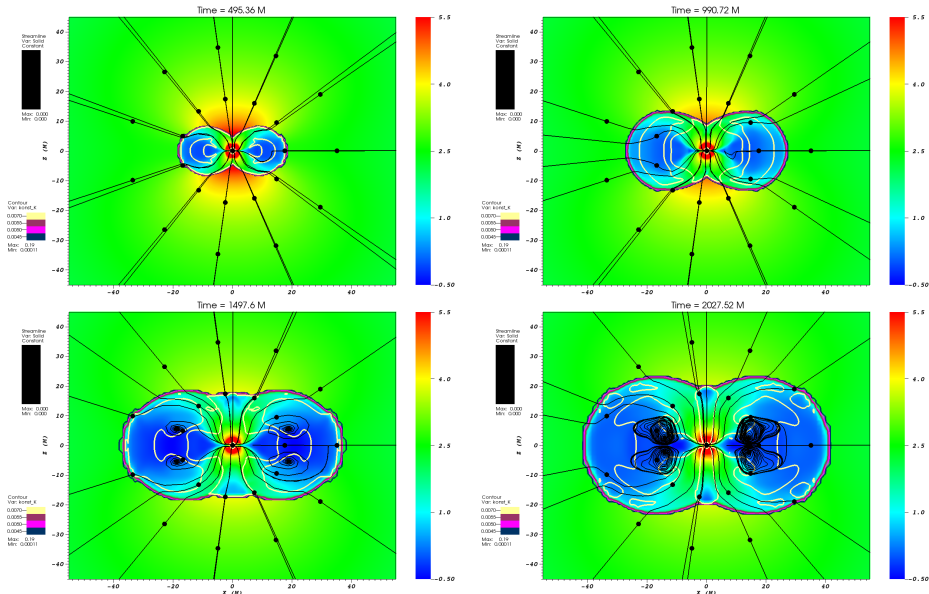
inviscid low angular
momentum flow
constant λ
Polytropic gas
EOS $p = K\rho^\gamma$
 \Rightarrow
for some parameters
more critical points
exist



\Rightarrow shock existence possible if Rankine-Hugoniot conditions satisfied

- 3D GR simulations of low angular momentum flows
- Einstein toolkit software package, GRHydro thorn
- Carpet, fixed mesh refinement - 8 levels of refinements
- Ideal gas, EOS $p = (\gamma - 1)\rho\varepsilon$
- Qualitative agreement with analytical results for the outer branch (solution without shock starting from Bondi + $u_{\text{BL}}^\phi = \frac{\lambda}{r^2} \sin^2 \theta$ converges to state close to the outer branch)





Initial conditions according to 1D shock solution with $\lambda_0 = 3.52M$,
 $\mathcal{E} = 0.0025$, $\gamma = 4/3 \rightarrow r_s = 13.97M$. Shock grows, oscillations develop.

Astrophysics group in CFT

Studies of BH in various cosmic environments:

1. BH mergers
2. Collapsars and GRB central engine
3. BH in Galaxy Center
4. Microquasars

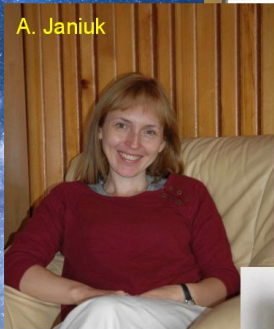
using time analysis of X-ray data, semi-analytical approach and numerical hydro-simulations with relativistic MHD

More information on our web page

<http://www.cft.edu.pl/astrofizyka>

including links to papers, talks, group schedule, lectures and simulation results

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