

PARAMETER STUDY OF A SEMI-ANALYTICAL RELATIVISTIC MHD JET MODEL IN COMPARISON WITH RECENT VLBI OBSERVATIONS

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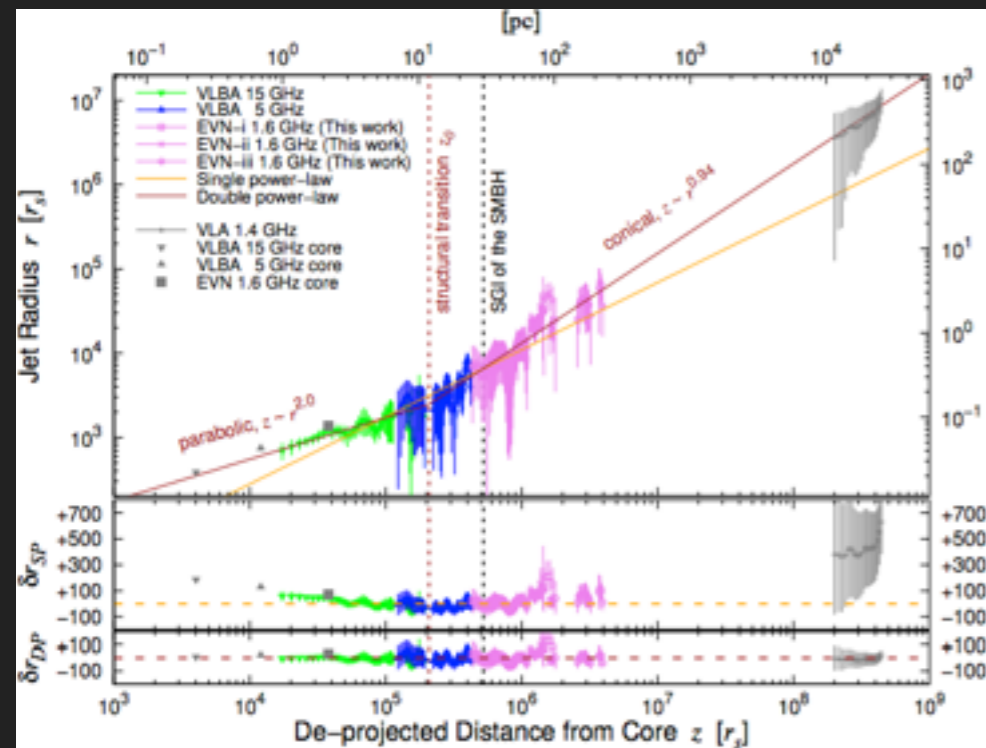
QUASI STATIONARY FEATURES IN AGN JETS

- ▶ In several AGN, there is evidence of a *quasi-stationary feature* in the super magnetosonic jet. **Recollimation Shock (RCS)**
- ▶ The stationary feature occurs at distances from the BH in the 10^3 - $10^6 R_g$ that translate into angular sizes of **10s of μ as to 10s of mas**.
- ▶ Downstream of *this feature*, the jet structure changes into a "new", coherent, steady jet up to large distances from the BH (~lobes, 100s of kpc). **RCS = "Jet break"**

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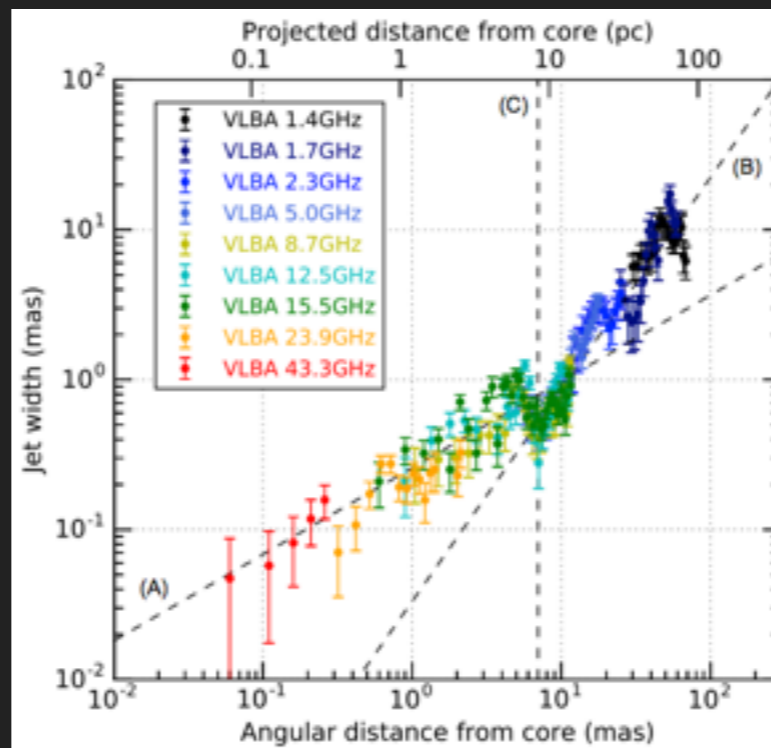
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NGC 6251



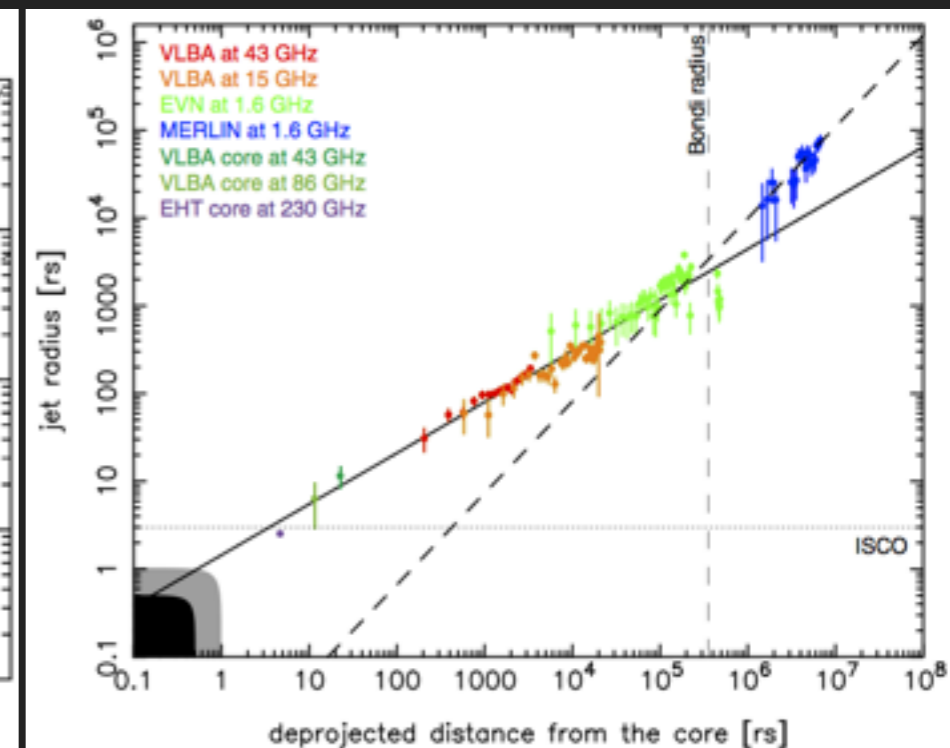
Tseng et al. 2018

1H 0323+342



Hada et al. 2018

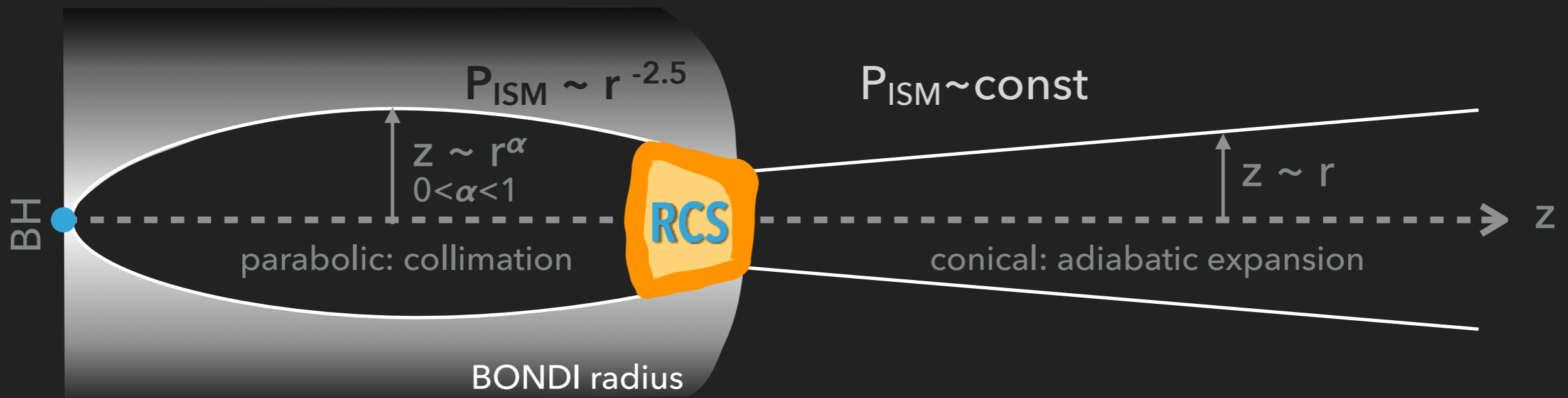
M87



Asada&Nakamura2012, Nakamura&Asada2013

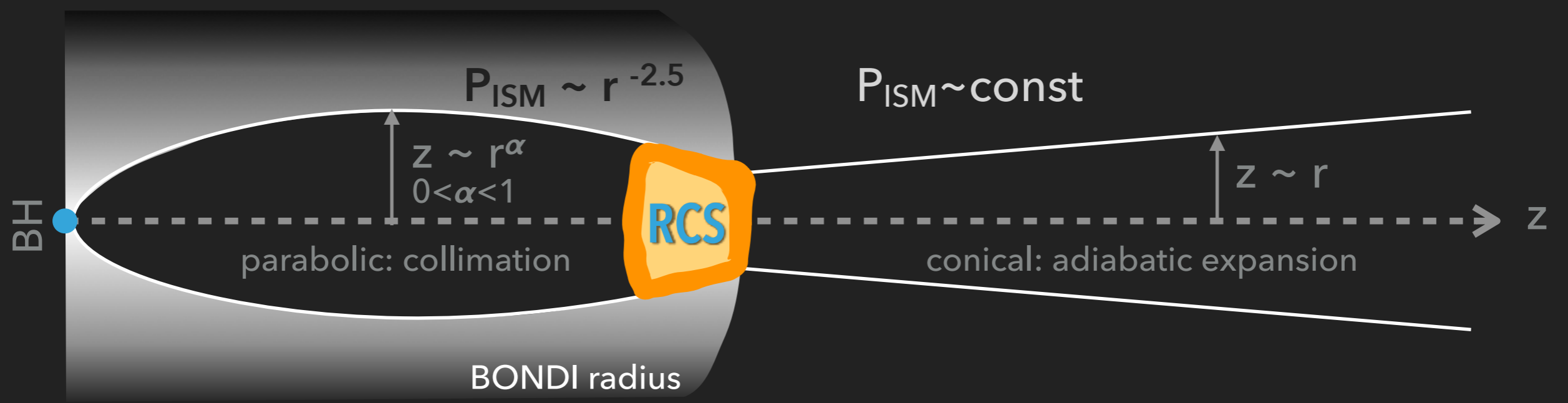
MAIN POSSIBLE CAUSES OF A RECOLLIMATION SHOCK

- ▶ External collimation \implies change in the ambient pressure at the Bondi radius e.g. Asada&Nakamura 2012, Nakamura&Asada 2013

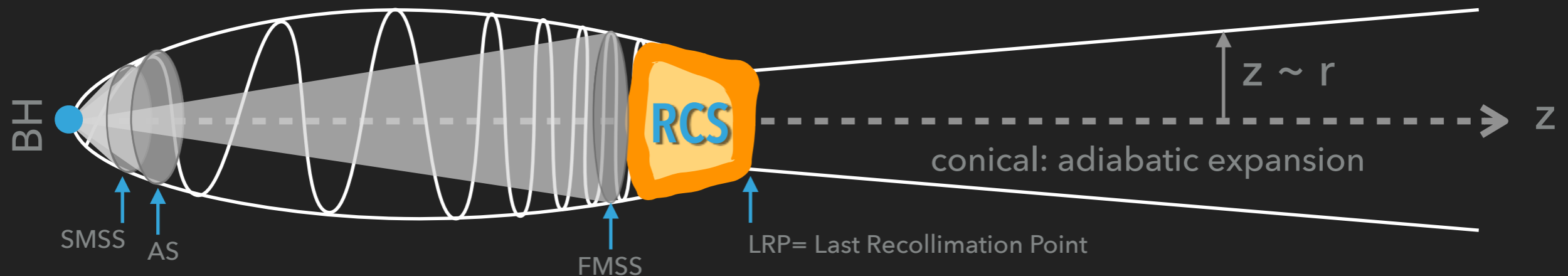


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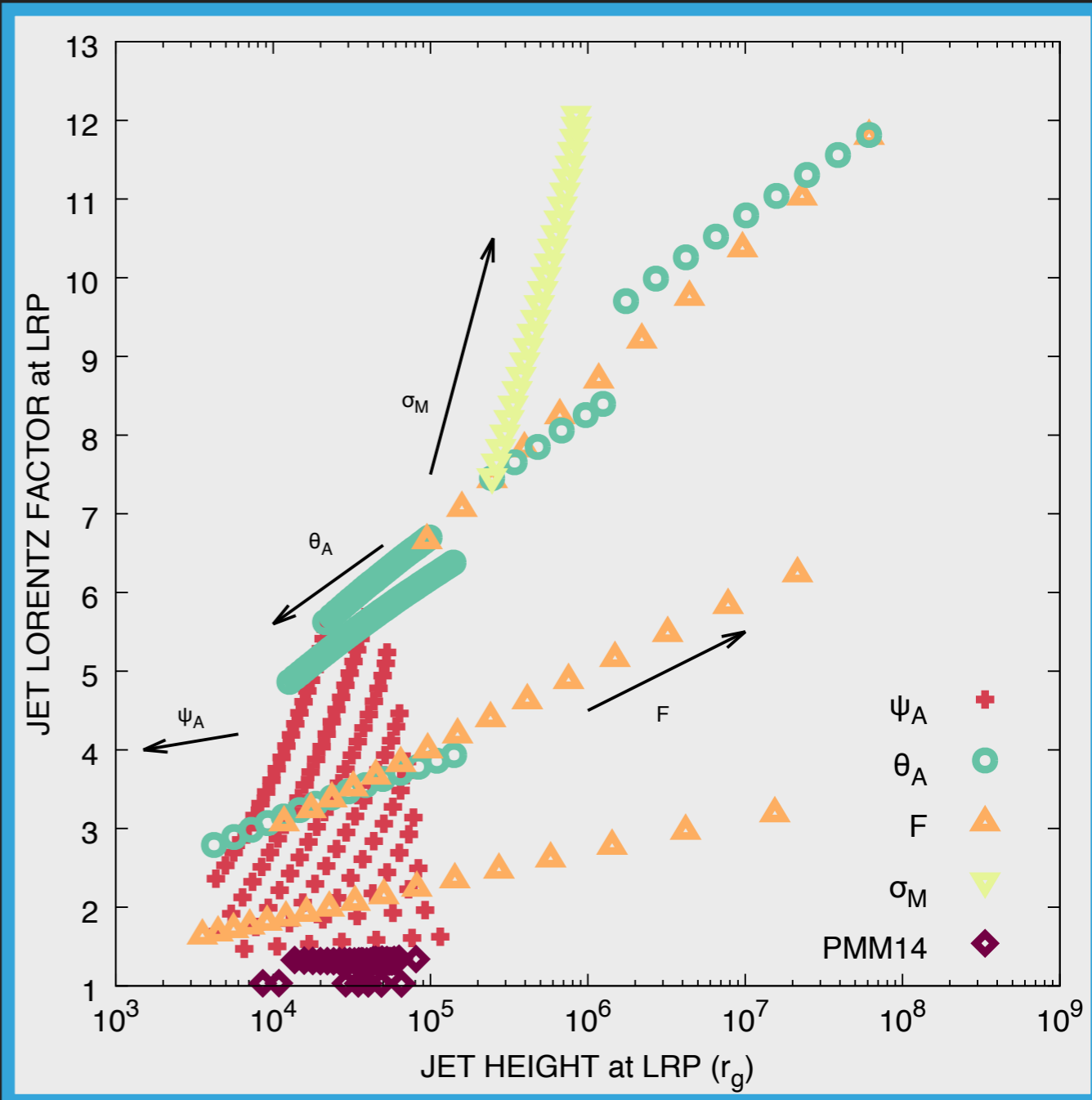
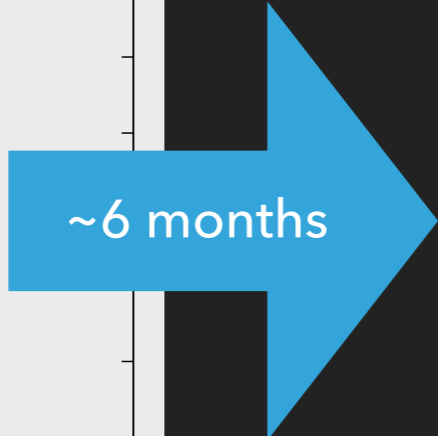
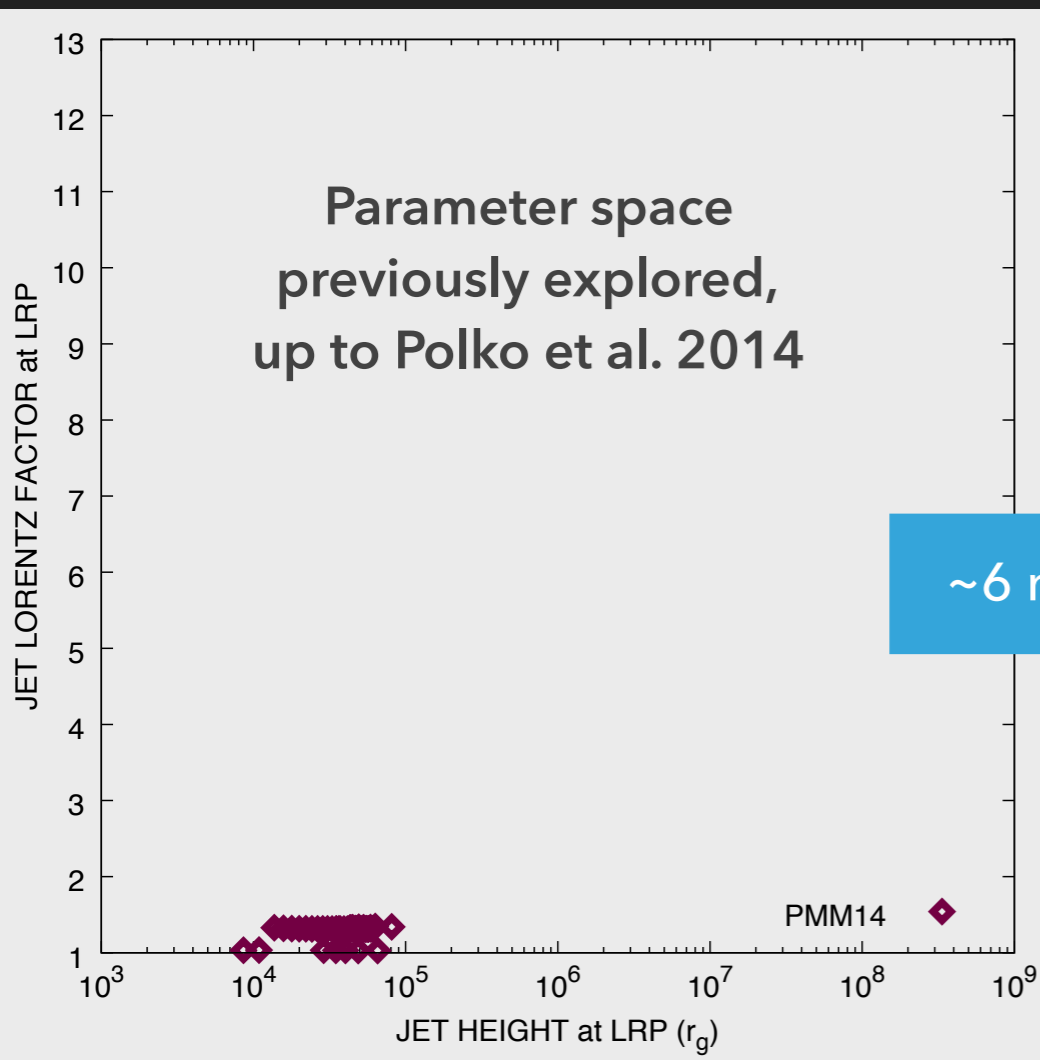


- ▶ Self-collimation \implies magnetic focusing at the Fast Magnetosonic Separatrix Surface e.g. Vlahakis et al. 2000, Polko et al. 2010, 2013, 2014, Ceccobello et al. 2018

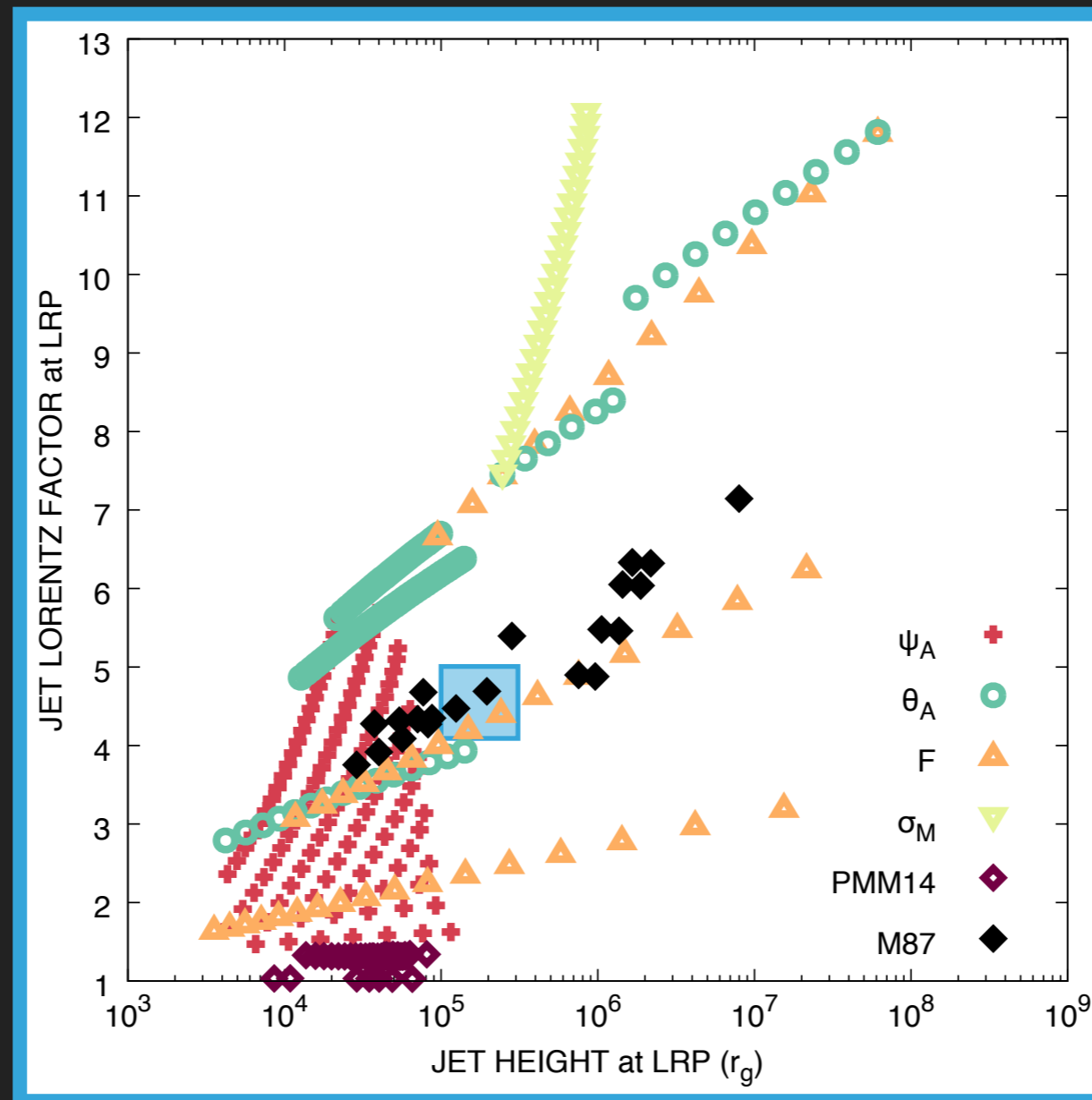


PARAMETER SEARCH WITH THE NEW METHOD

Ceccobello et al. 2018

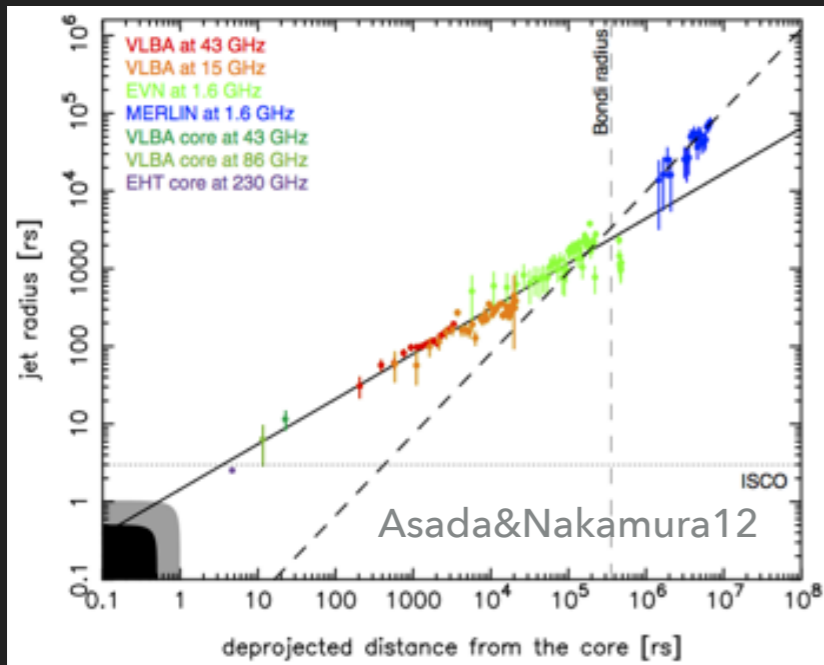


AN EXAMPLE OF SOURCE-DRIVEN PARAMETER SEARCH: M87

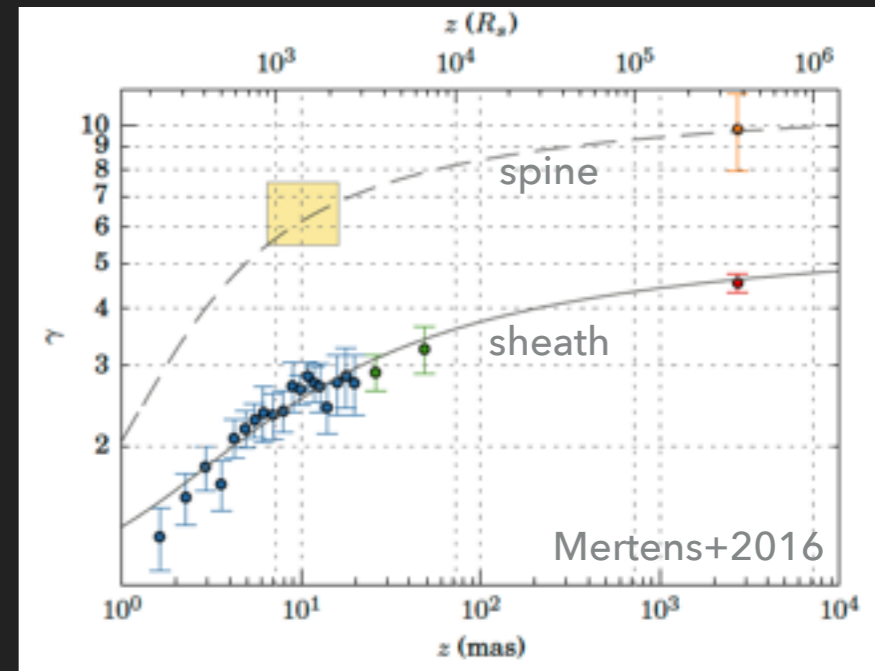
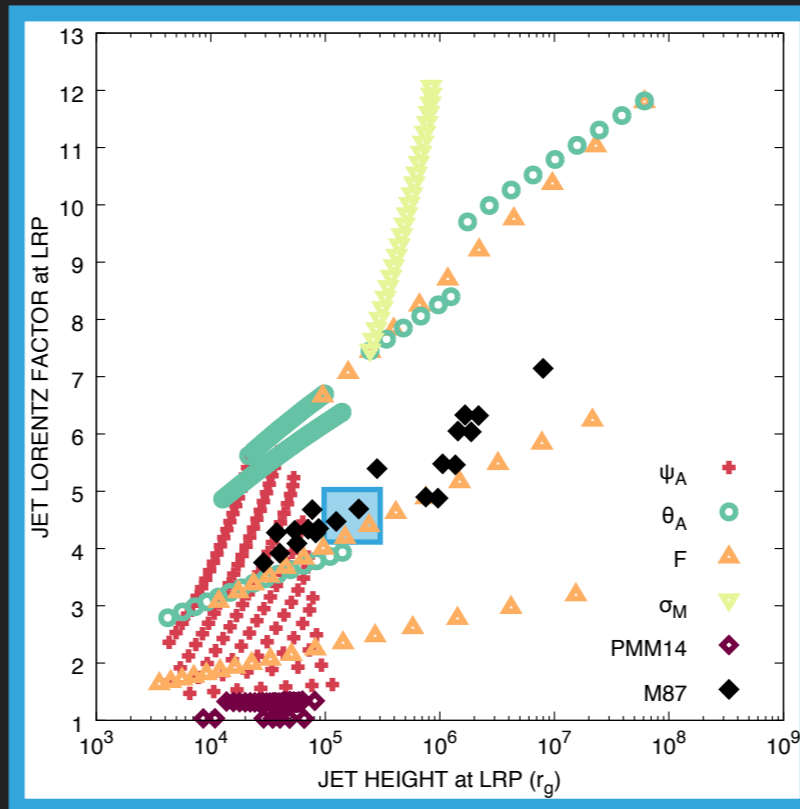


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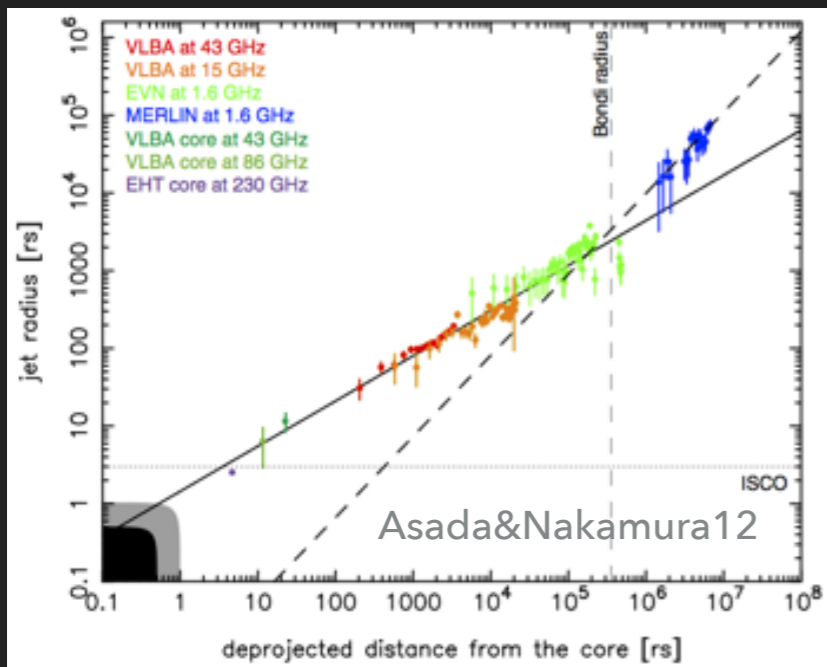
Radial profile



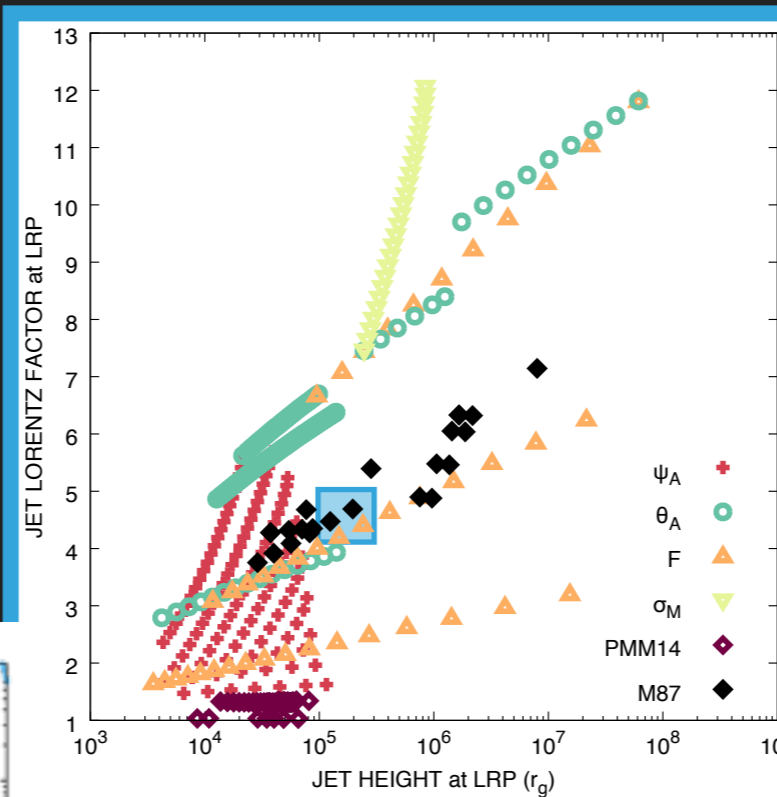
Jet sheath LF profile

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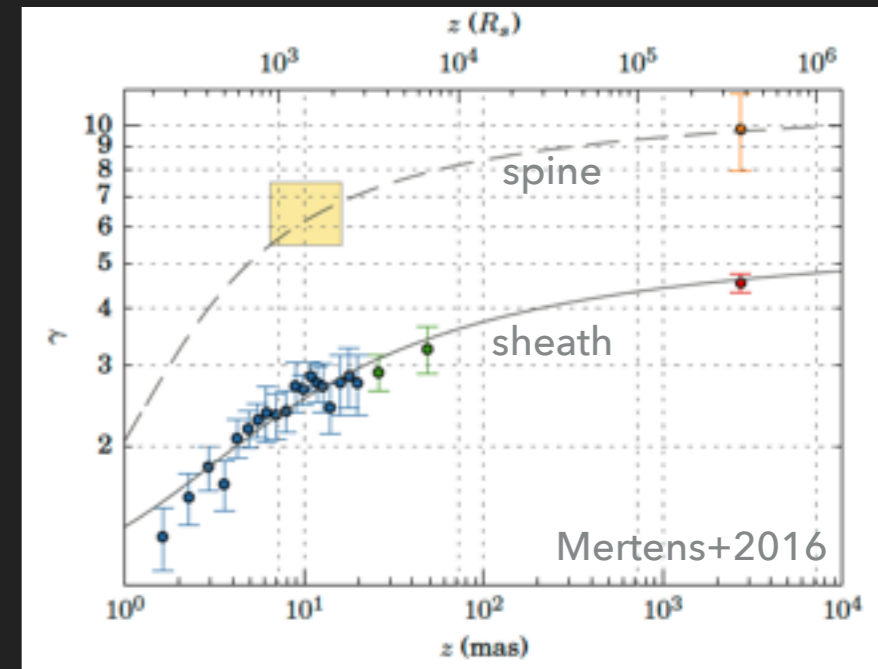
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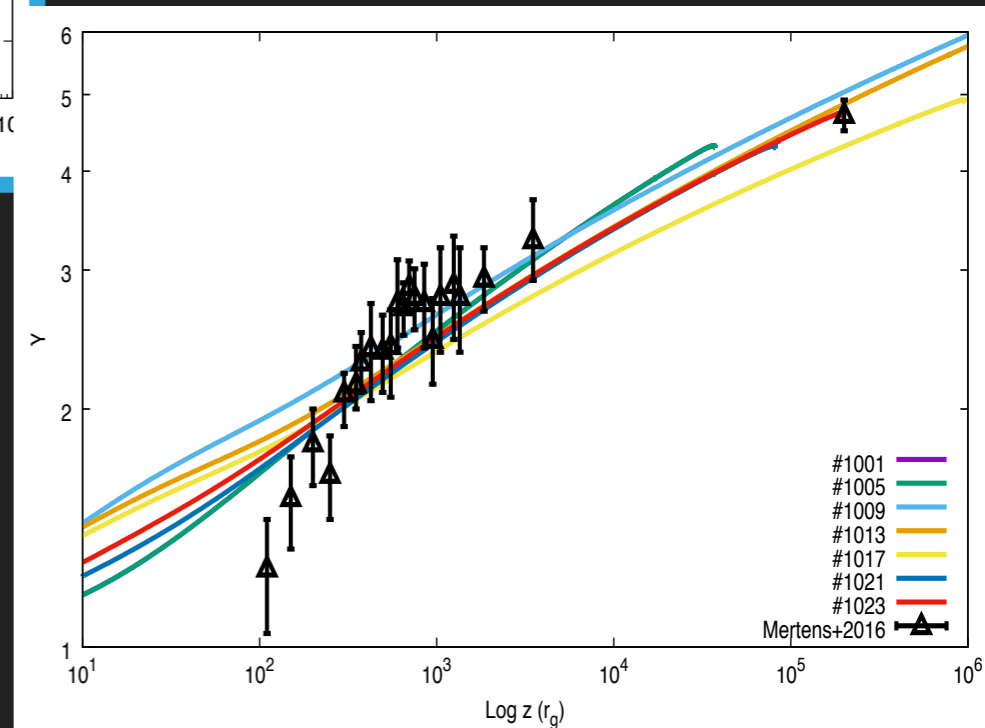
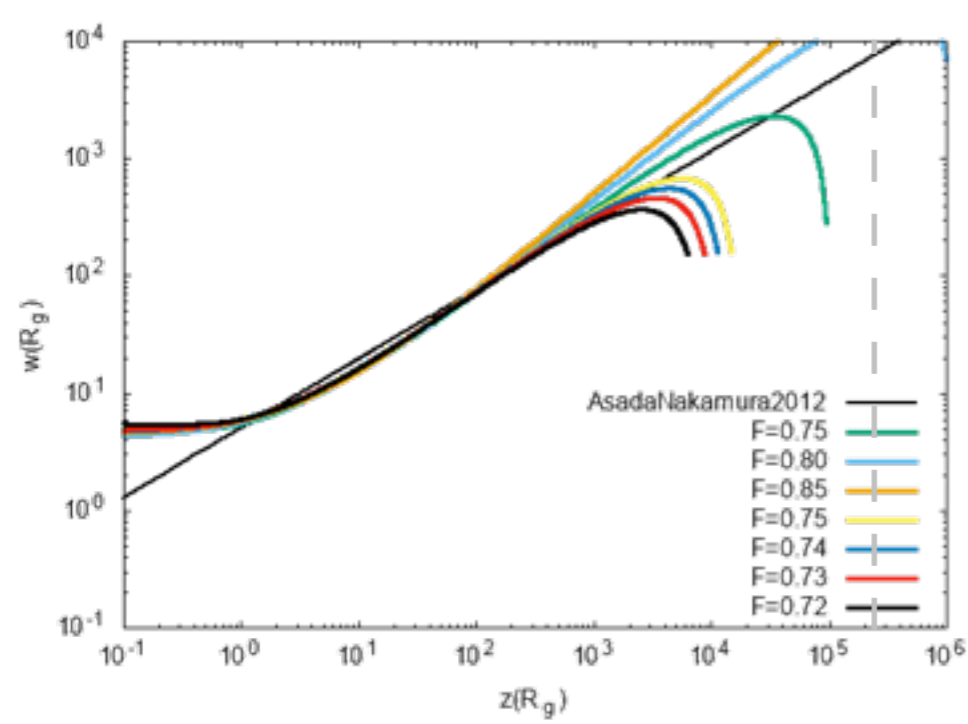
Radial profile



PRELIMINARY



Jet sheath LF profile



SUMMARY

- ▶ Thanks to the new algorithm, we can now perform source-driven parameter searches
- ▶ Non-relativistic extension and parameter study of the MHD jet model (Ceccobello et al. in prep)
- ▶ NEXT STEP: Coupling with the radiative transfer code AGNJET (e.g. Markoff et al. 2005, Crumley, Ceccobello et al. 2017, Connors et al. 2017) and further development of this code to include non-relativistic radiative processes and fit the SEDs of several kinds of systems.

