Multiwavelength Modeling of the LFBOT AT2024wpp

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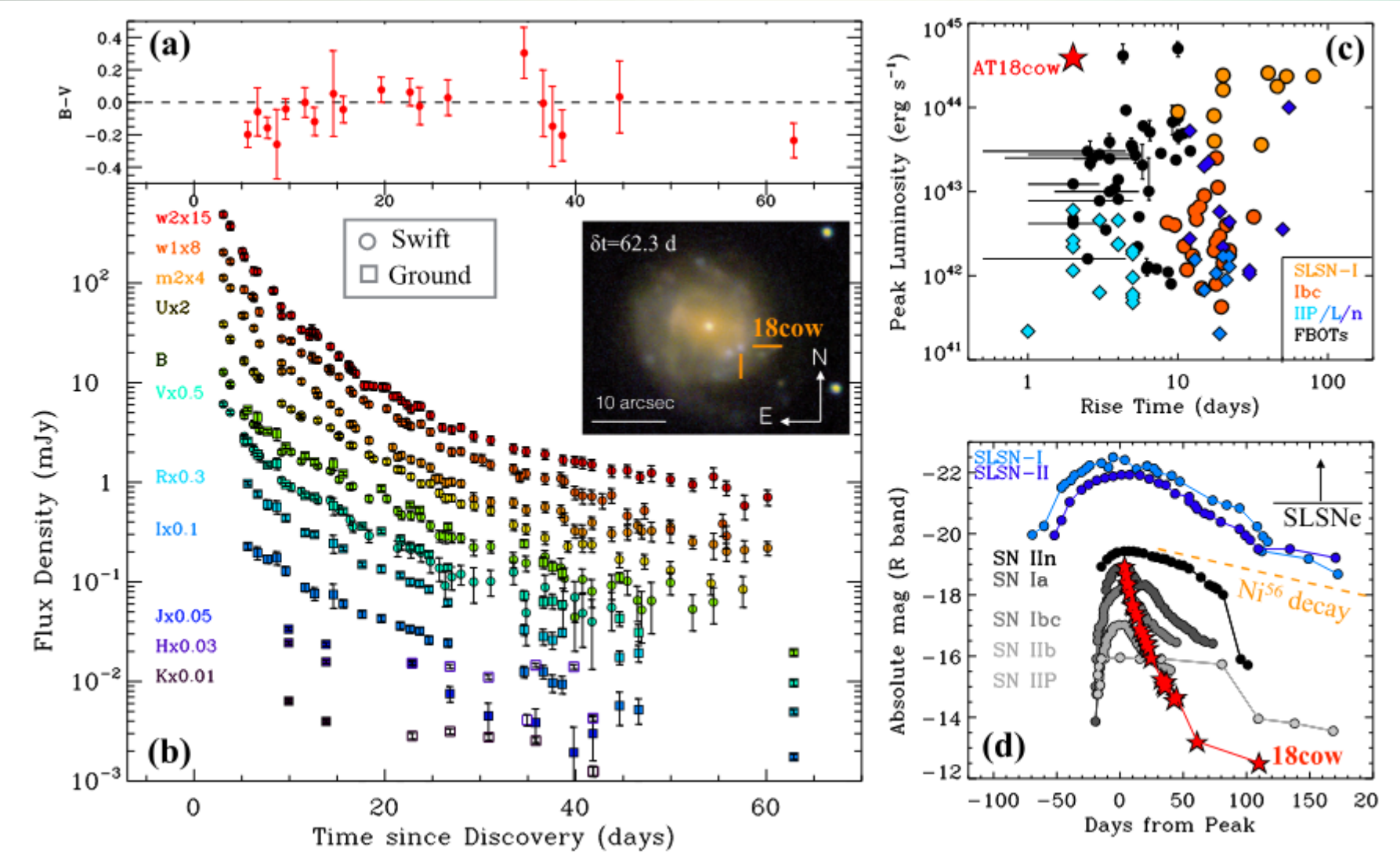
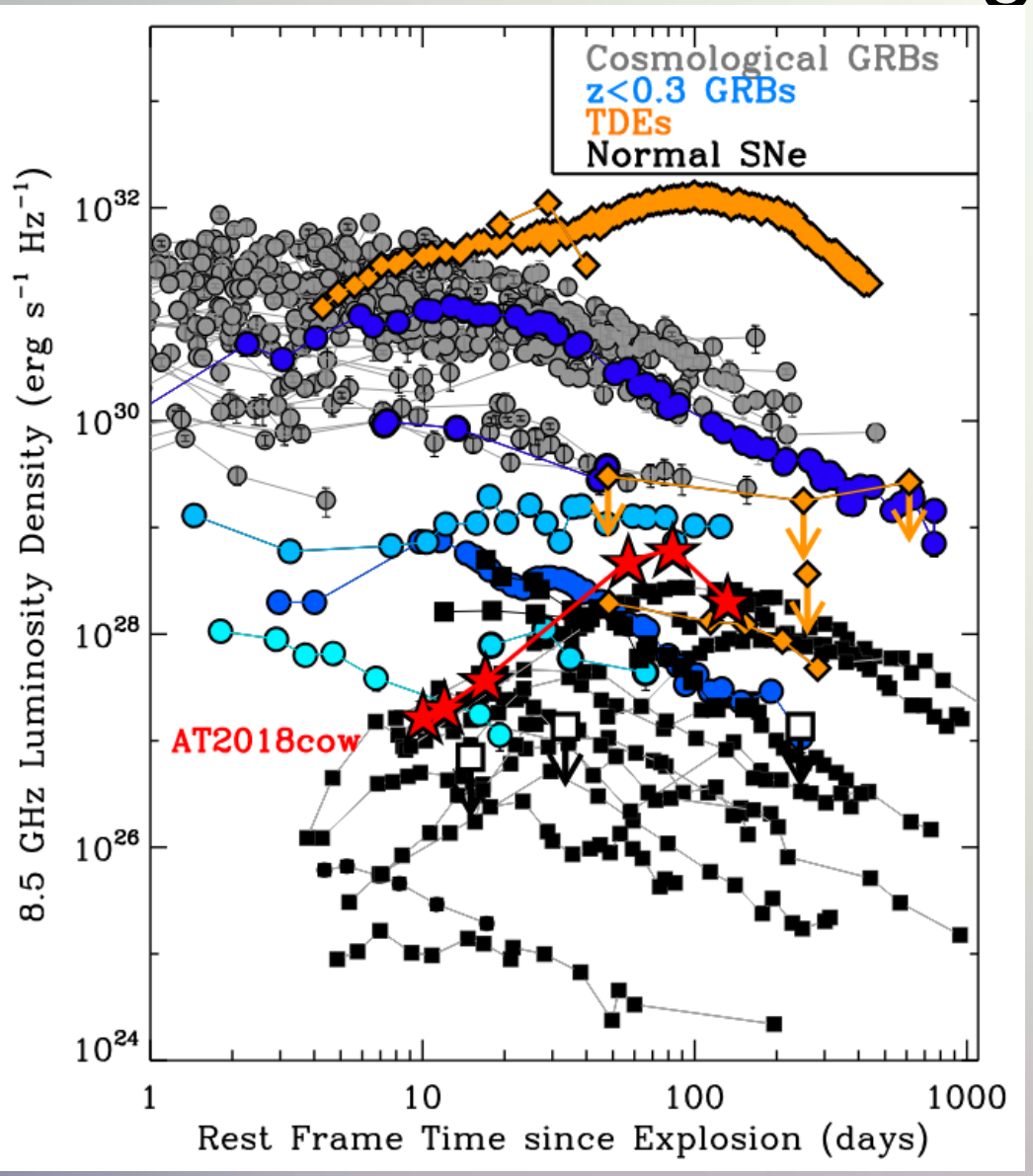
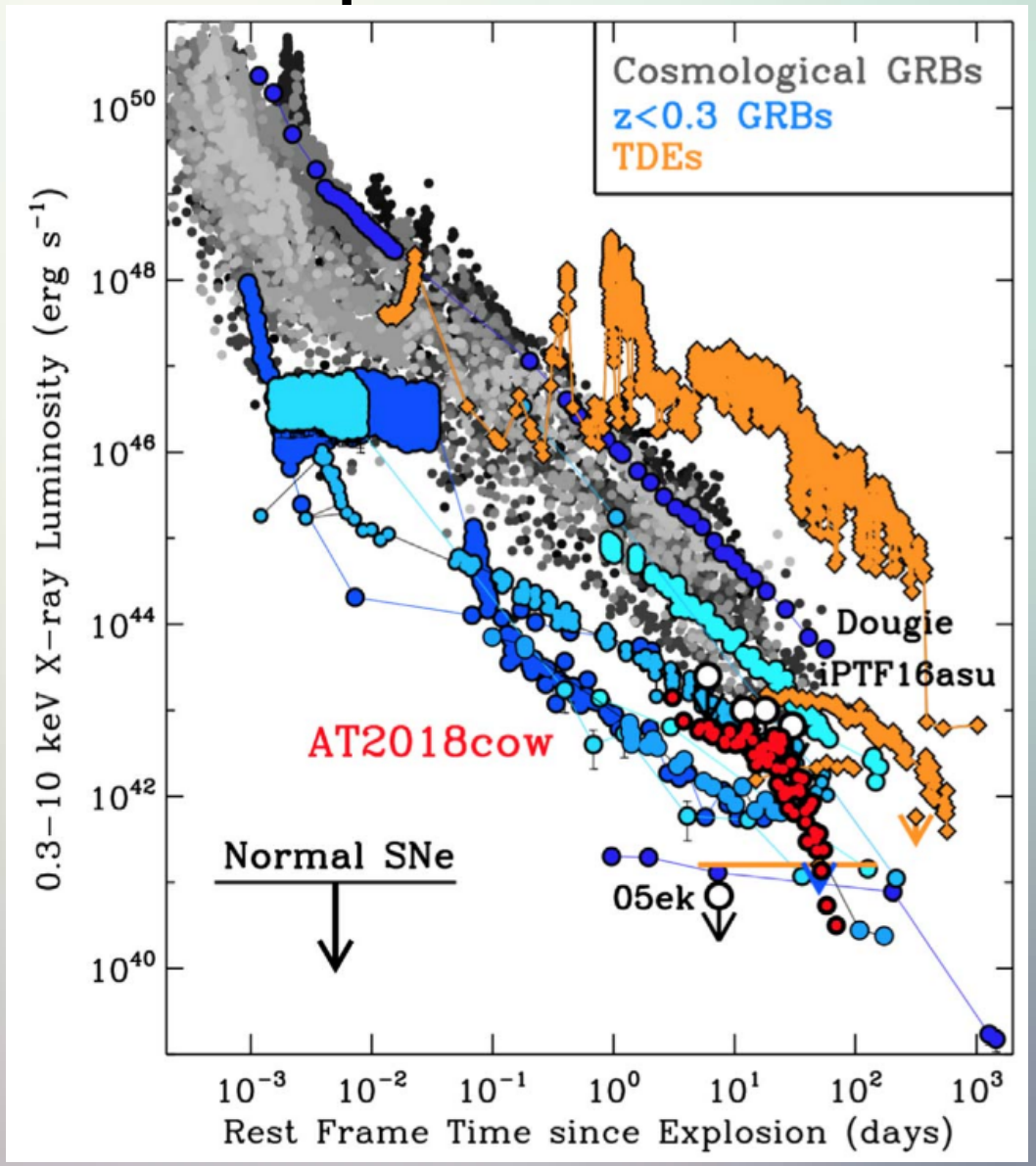
The Prototype LFBOT: AT2018cow



Margutti+ (2019)

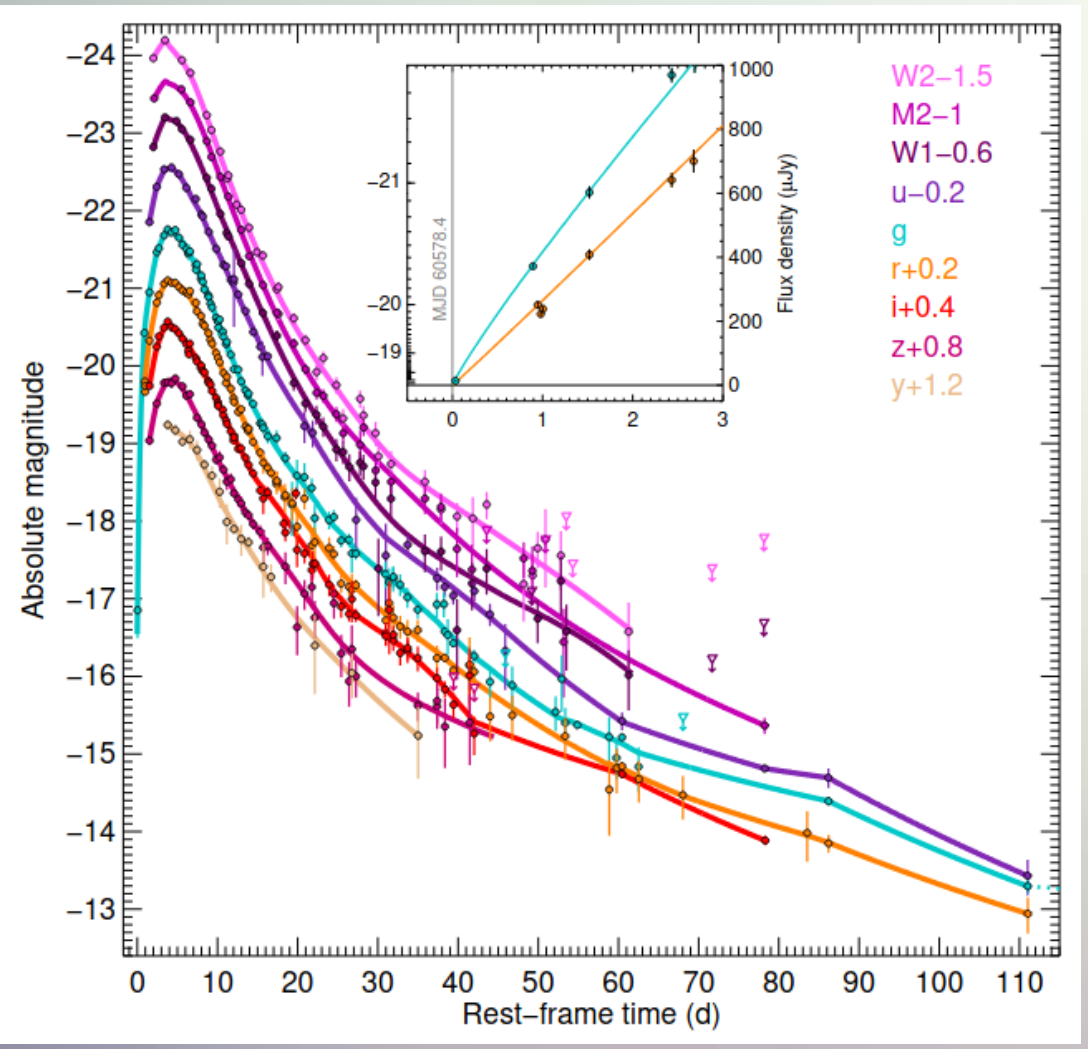
Multiwavelength Comparison

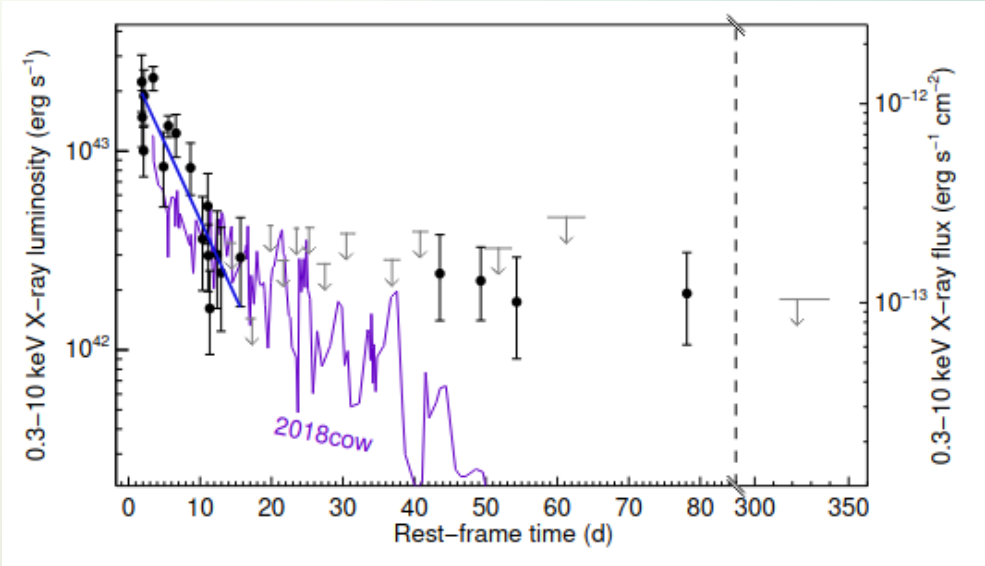


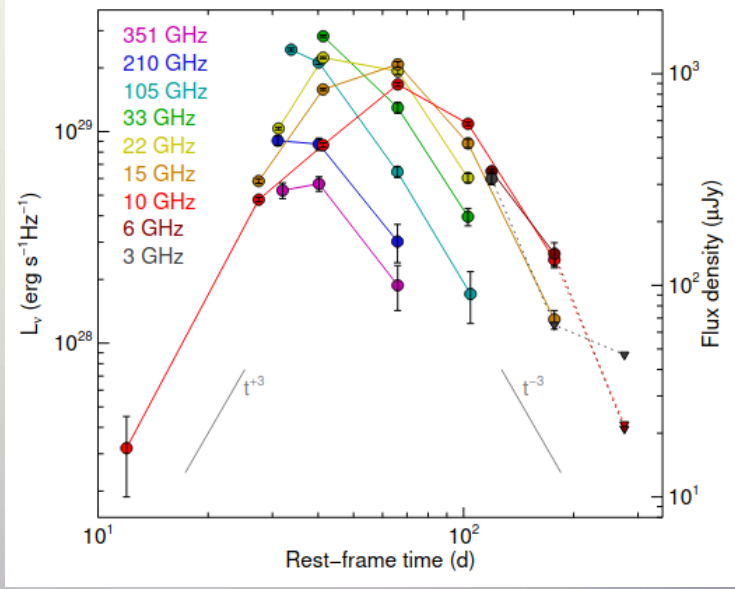


Margutti+ (2019)

AT2024wpp (the “Whippet”)

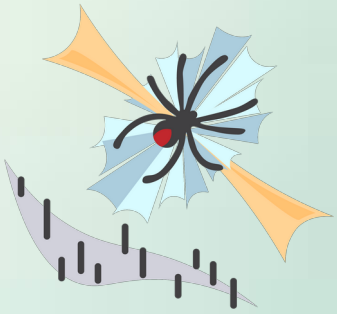






Perley+ (2026)

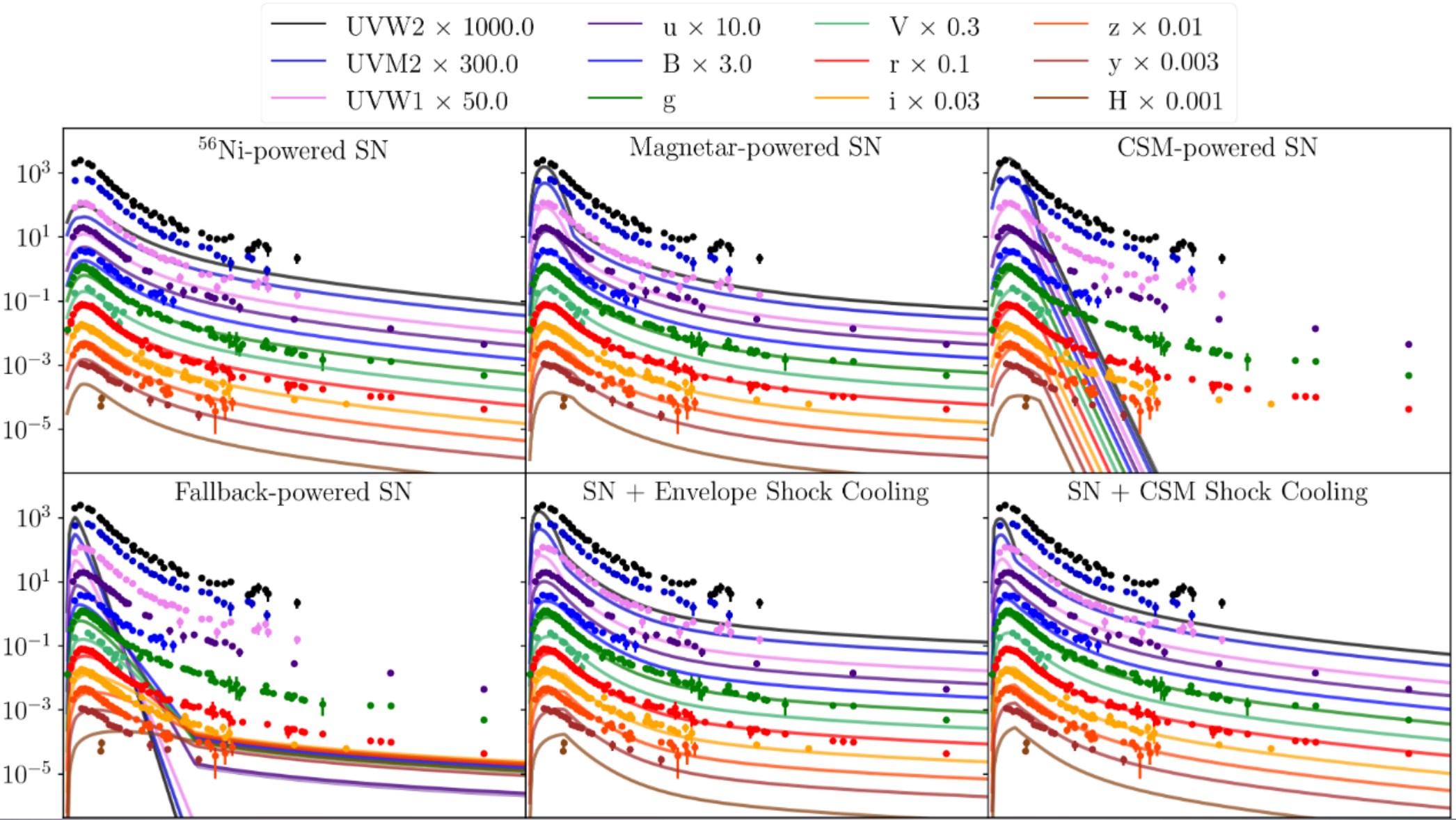
Models Used



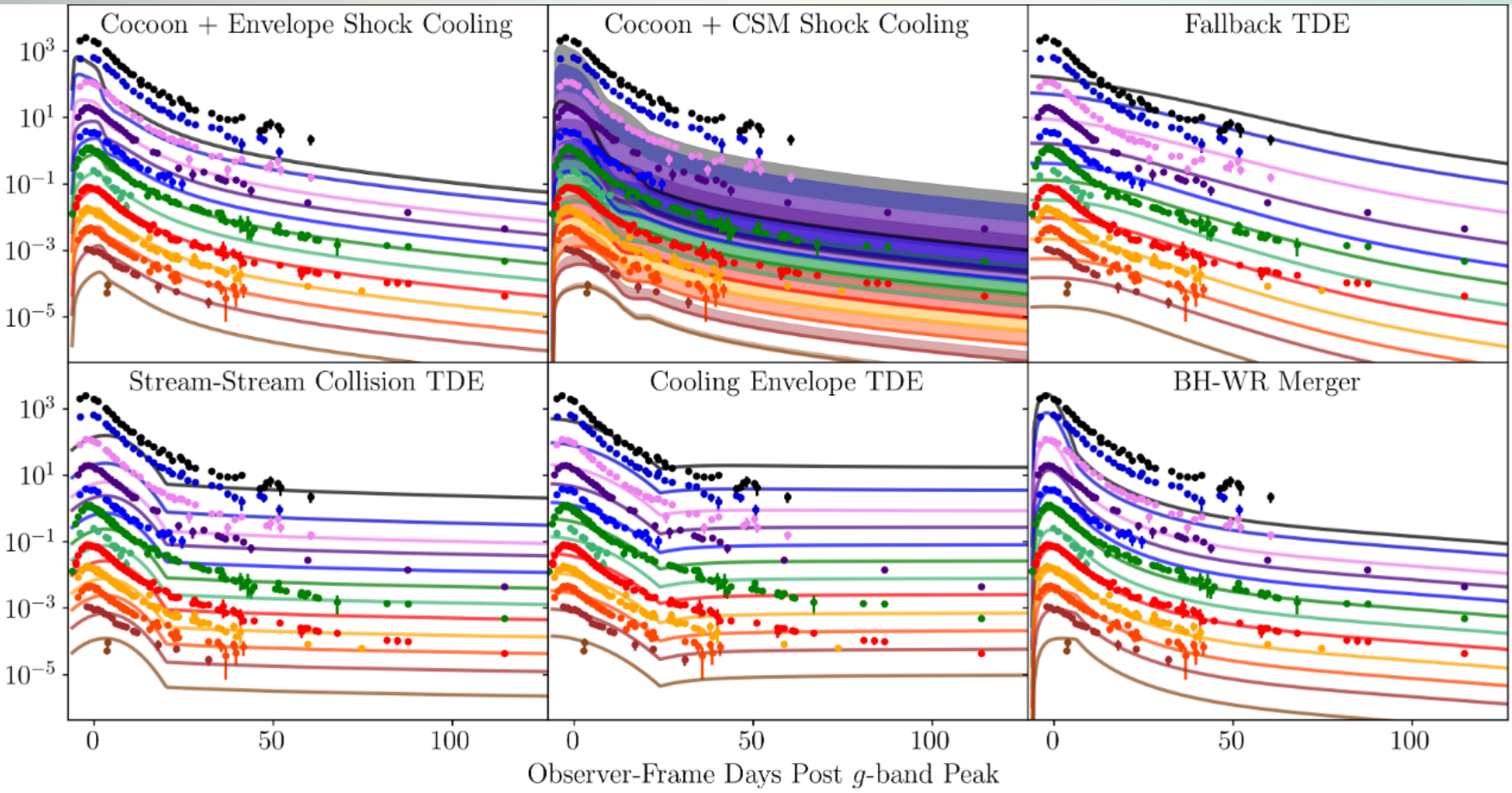
Model	REDBACK Model Name	Reference
	Optical	
Evolving Blackbody	evolving_blackbody	Sarin et al. (2024)
^{56}Ni-powered SN	arnett	Arnett (1982)
Magnetar-powered SN	general_magnetar_driven_supernova	Sarin et al. (2022); Omand & Sarin (2024)
CSM-powered SN	csm_nickel	Chatzopoulos et al. (2013); Villar et al. (2017); Jiang et al. (2020)
Fallback-powered SN	sn_nickel_fallback	Guillochon et al. (2018)
SN + Envelope Shock Cooling	shockcooling_sapirwaxman_and_arnett	Sapir & Waxman (2017)
SN + CSM Shock Cooling	shock_cooling_and_arnett	Piro et al. (2021)
Cocoon + Envelope Shock Cooling	shocked_cocoon_and_arnett	Piro & Kollmeier (2018)
Cocoon + CSM Shock Cooling	shocked_cocoon_csm_and_arnett	Hamidani et al. (2025a,b)
Fallback TDE	tde_fallback	Guillochon & Ramirez-Ruiz (2013); Guillochon et al. (2018); Mockler et al. (2019)
Stream-Stream Collision TDE	stream_stream_tde	Piran et al. (2015); Ryu et al. (2020)
Cooling Envelope TDE	gaussianrise_cooling_envelope	Metzger (2022b); Sarin & Metzger (2024)
BH-WR Merger	wr-bh_merger	Metzger (2022a)
	Radio and X-ray	
Top-hat Jet	tophat_redback	Lamb et al. (2018)
Gaussian Jet	gaussian_redback	Lamb et al. (2018)
Power-Law Synchrotron	synchrotron_pldensity	Rosswog & Brüggen (2007); Chevalier & Fransson (2017)
Thermal Synchrotron	thermal_synchrotron_v2_fluxdensity	Margalit & Quataert (2021, 2024)
Accretion Disc	fitted	Mummery & Balbus (2020); Mummery et al. (2024a,b)
Top-hat Jet + Accretion Disc	tophat_redback & fitted	

Table 1. The optical, radio, and X-ray models used to fit the data for AT2024wpp, and their associated references.

Optical Fits (1/2)

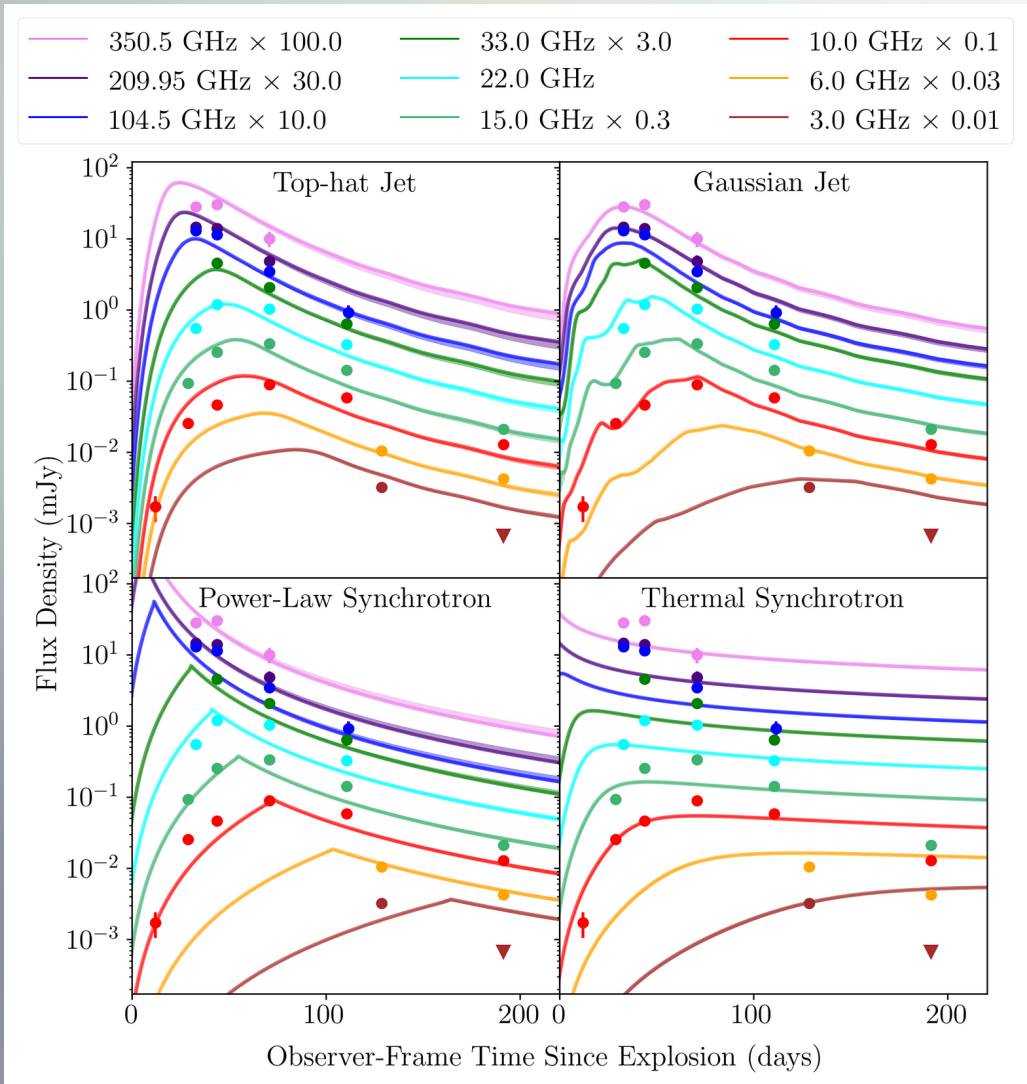


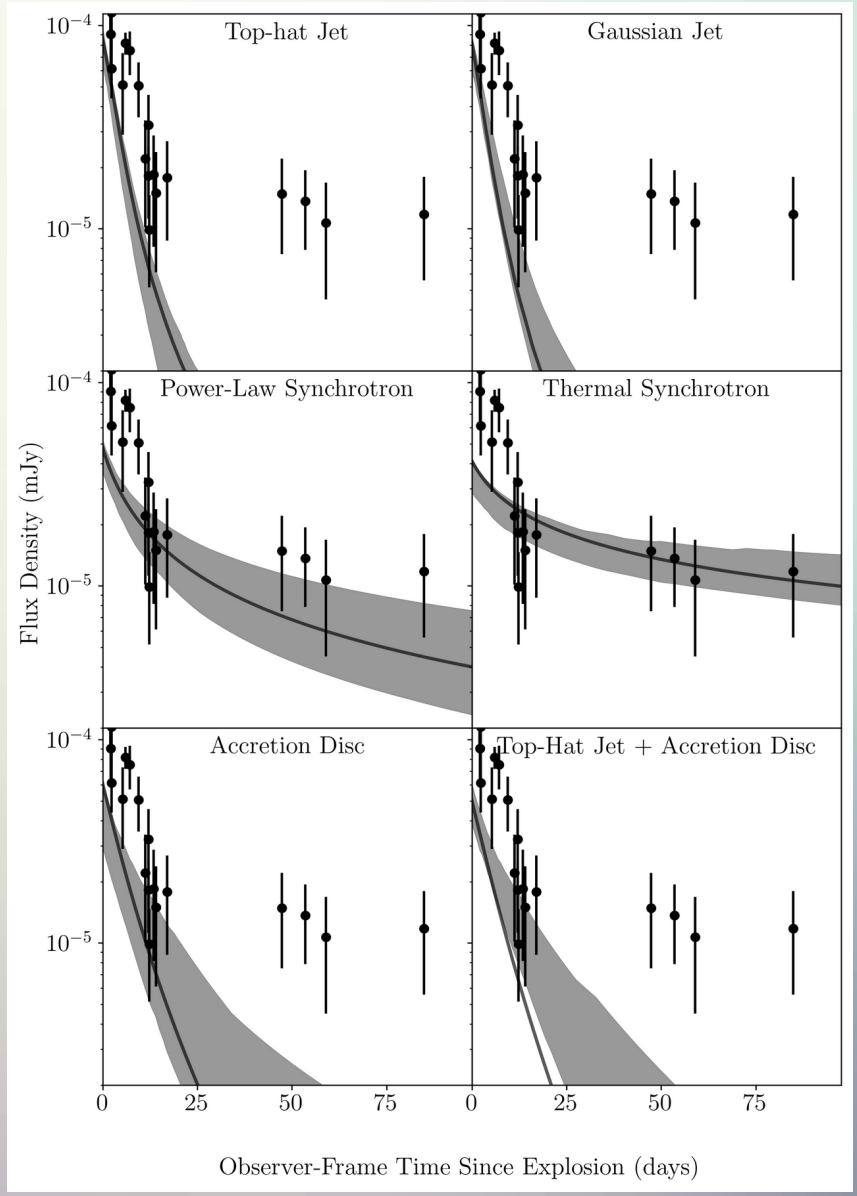
Optical Fits (2/2)



Omand+ (2026)

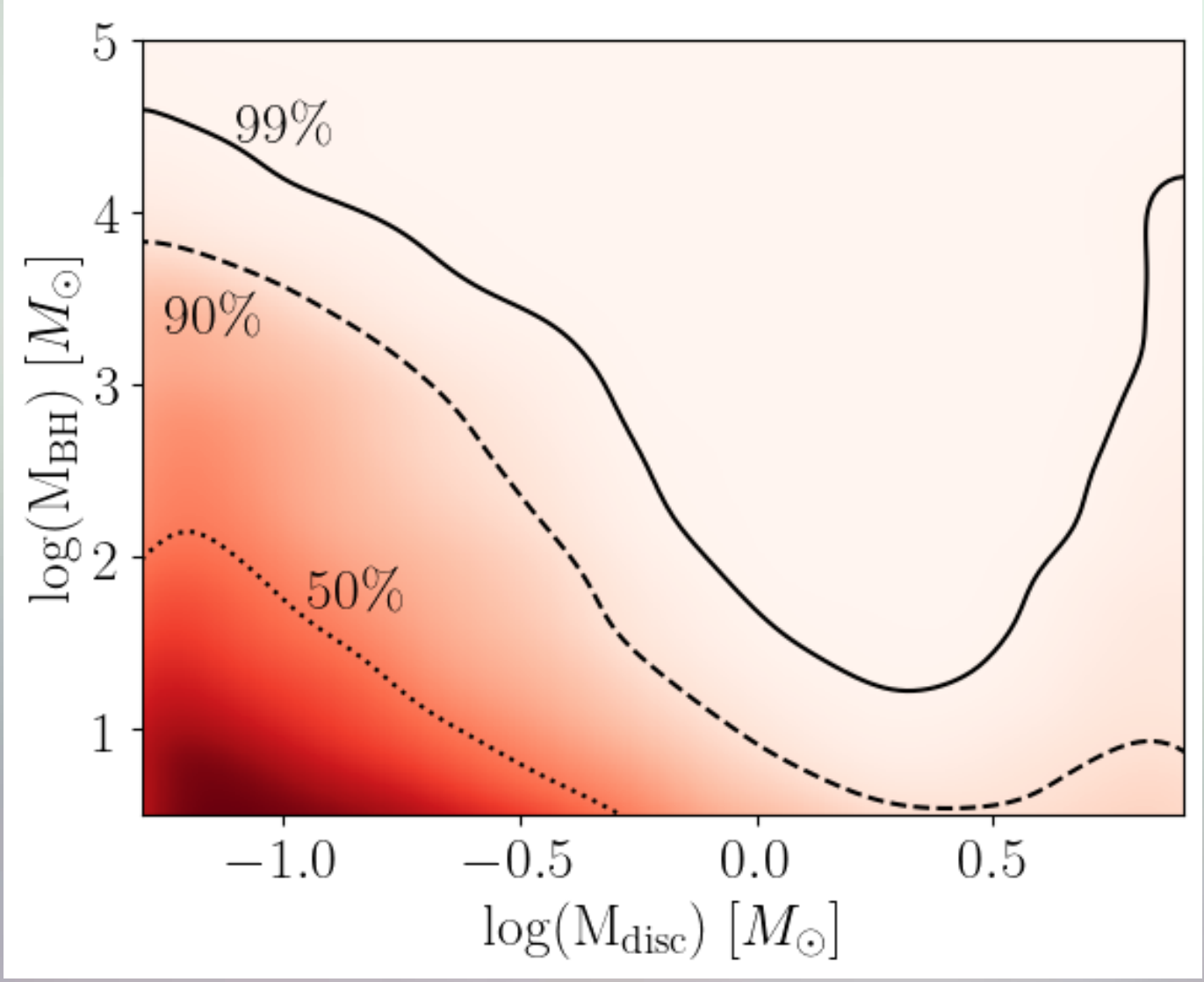
Non-Thermal Fits





Omand+ (2026)

Constraints on BH and Disc Mass



Omand+ (2026)

Final Thoughts

- Bolometric models can reproduce light curve, but broadband behaviour doesn't fit
- Photospheric behaviour excludes homologously expanding models
- Non-thermal behaviour is complicated, no simple models fit
- HST observations exclude TDEs with $M_{BH} < 10^4\ M_\odot$
- Lots of theory work still to be done