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Probing the jet launching mechanism from prompt emission of GRBs

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Despite years of extensive research, the launching mechanism and the nature of relativistic jets remain open questions. Using 3D RMHD simulations of GRB jets with different initial magnetizations and engine modulation timescales, we calculate the resulting prompt emission light curves by considering photospheric emission and internal shocks, and compare them with observations. Our results show that in order to reconstruct the observed high variability and efficiency of GRB light curves, the jets' degree of magnetization has to be at least $\sim 1\%$ and the central engine intermittency operates on ~ 10 ms timescales.

Primary author: GOTTLEB, Ore (Tel Aviv University/CIERA)

Co-authors: Prof. NAKAR, Ehud (Tel Aviv University); Prof. LEVINSON, Amir (Tel Aviv University); Dr BROMBERG, Omer (Tel Aviv University)

Presenter: GOTTLEB, Ore (Tel Aviv University/CIERA)

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