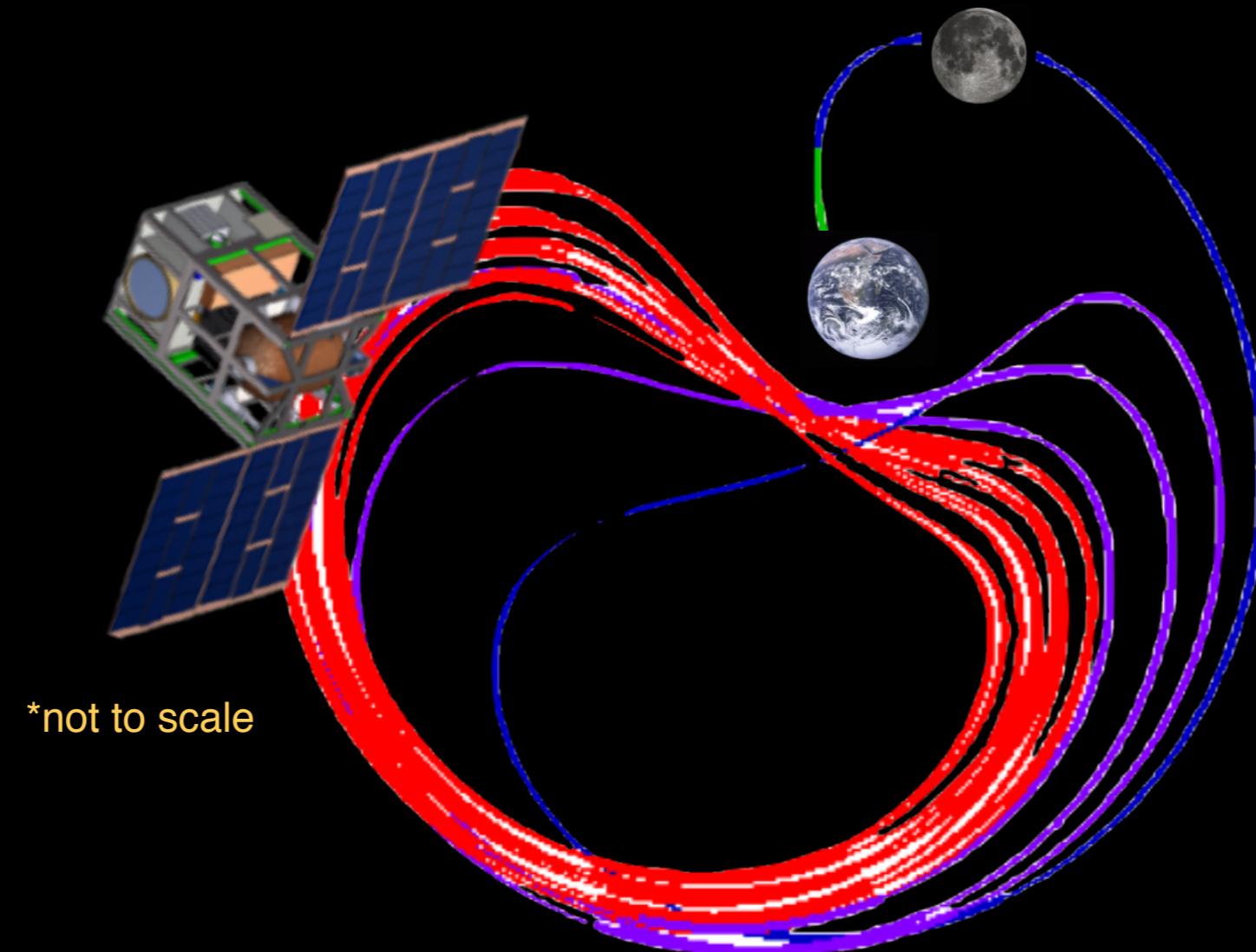
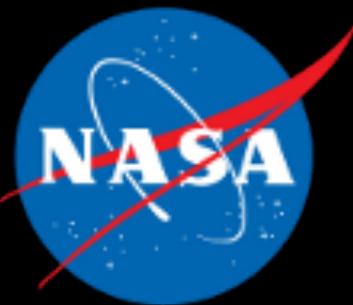


MoonBEAM

A beyond Earth-orbit GRB detector for multi-messenger astronomy



C. Michelle Hui (NASA/MSFC)

MSFC: D. Kocevski, T. Littenberg, C. Wilson-Hodge, J. Wood

UAH: M. Briggs, P. Jenke

USRA: C. Fletcher, A. Goldstein, O. Roberts

GSFC: E. Burns, J. Perkins, J. Racusin, J. R. Smith

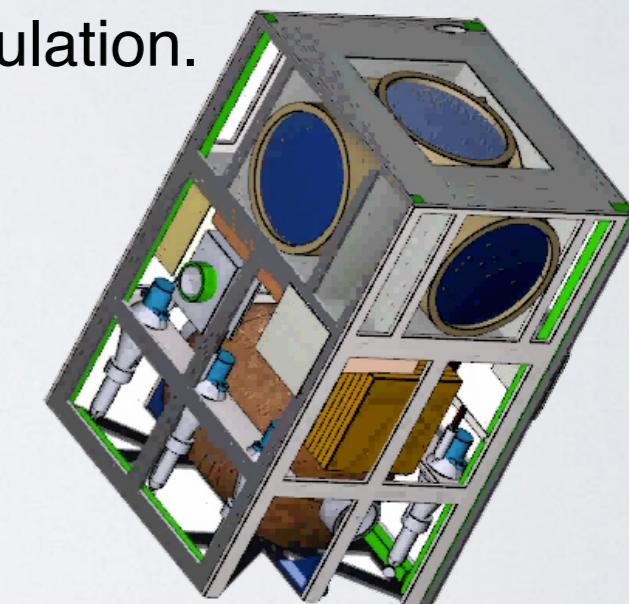
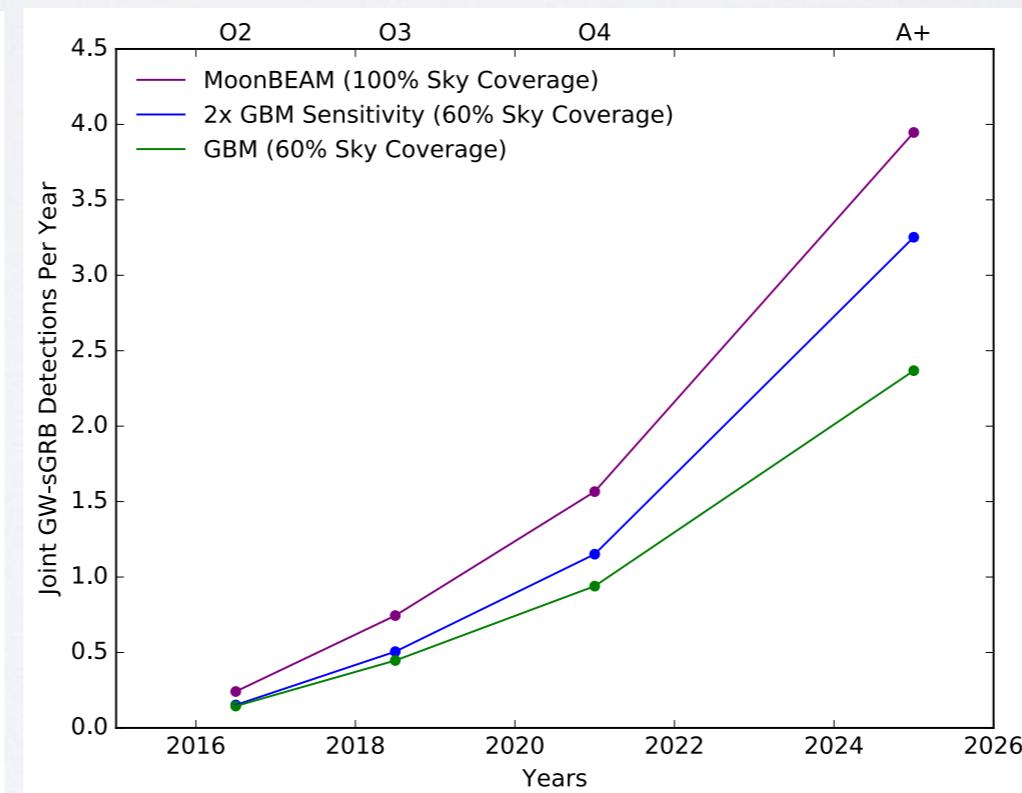
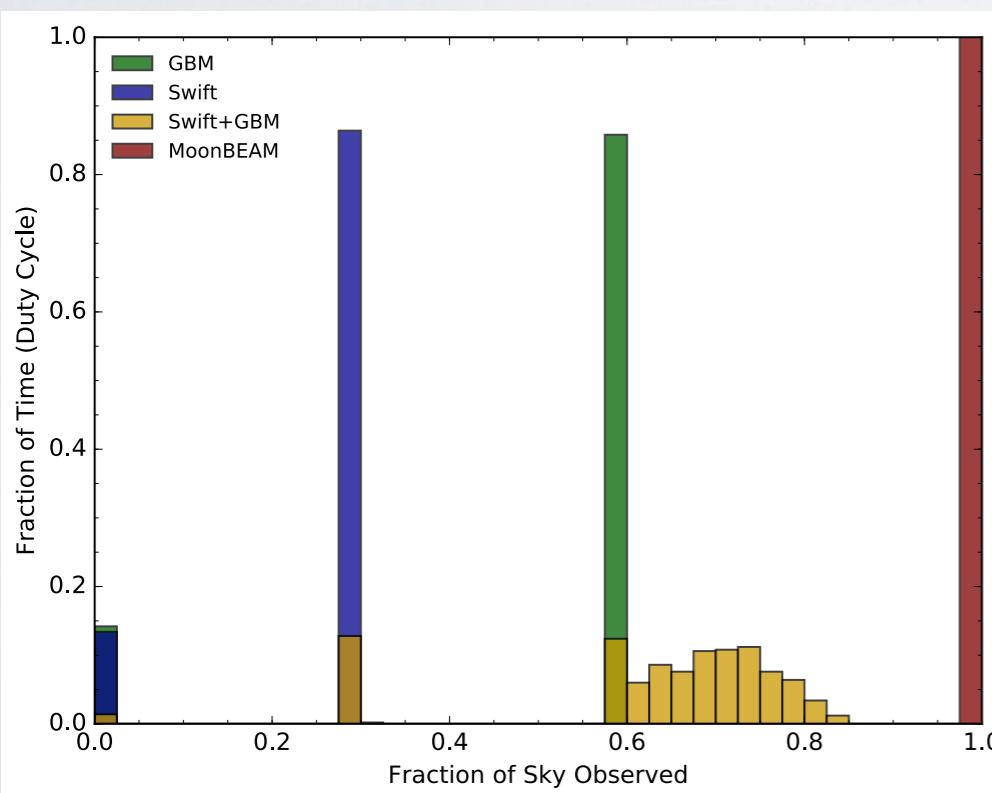


MoonBEAM

Moon Burst Energetics All-sky Monitor



- 2-year SmallSat mission concept to detect gamma-ray bursts.
- Science instrument is 5 detector modules (NaI/CsI phoswich + SiPM) positioned to maximize sky coverage.
- Cislunar orbit at L3 point of Earth-Moon system (95,500 – 665,000 km from Earth).
 - ▶ Earth occults < 0.1% of sky at maximum.
 - ▶ High duty cycle, no SAA passage.
 - ▶ More stable background compared to Low Earth Orbit.
 - ▶ Additional localization improvement with IPN-like timing triangulation.



SGRB rate estimate
30-70/year
*assuming single-crystal
detector

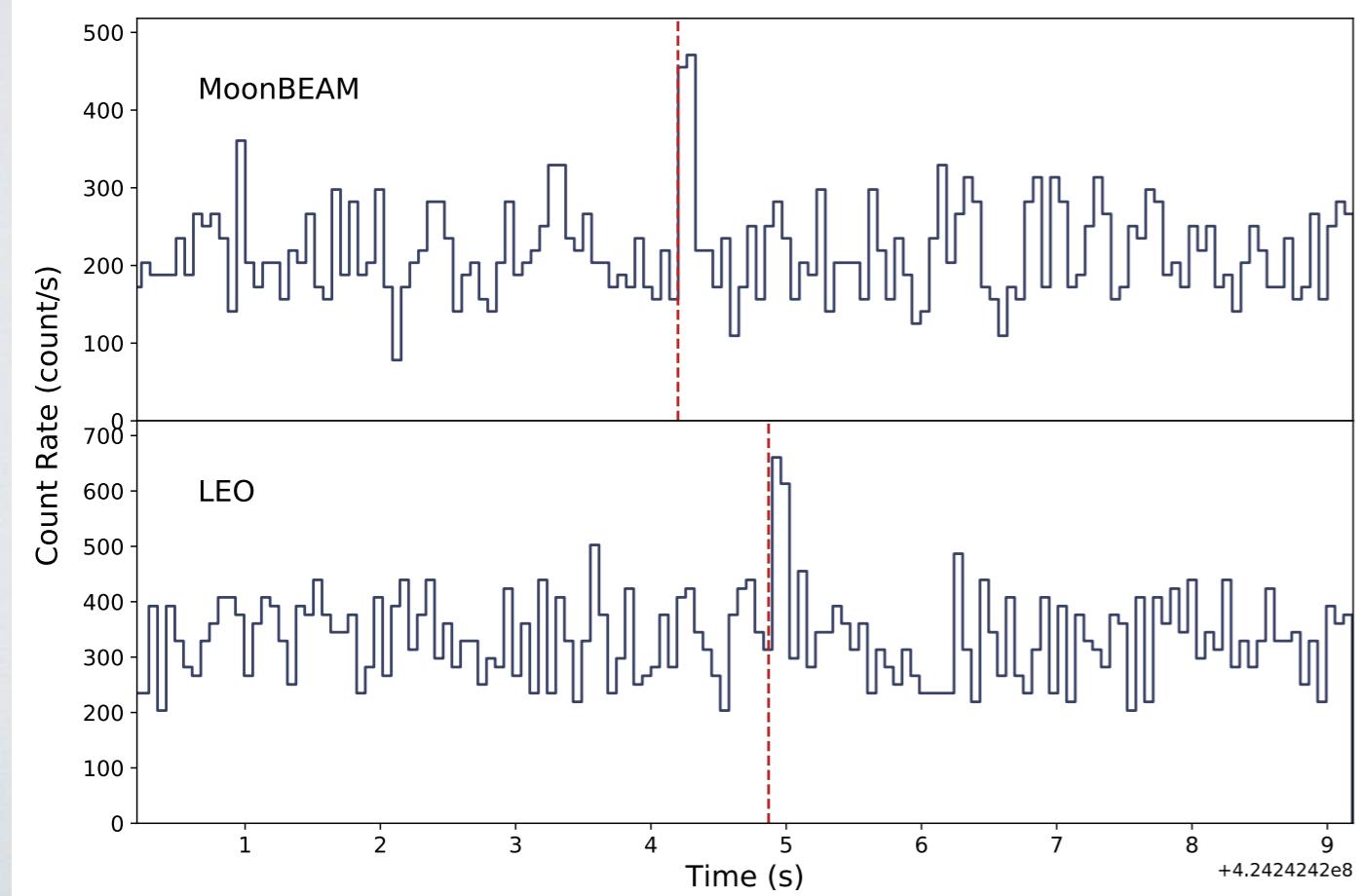


MoonBEAM

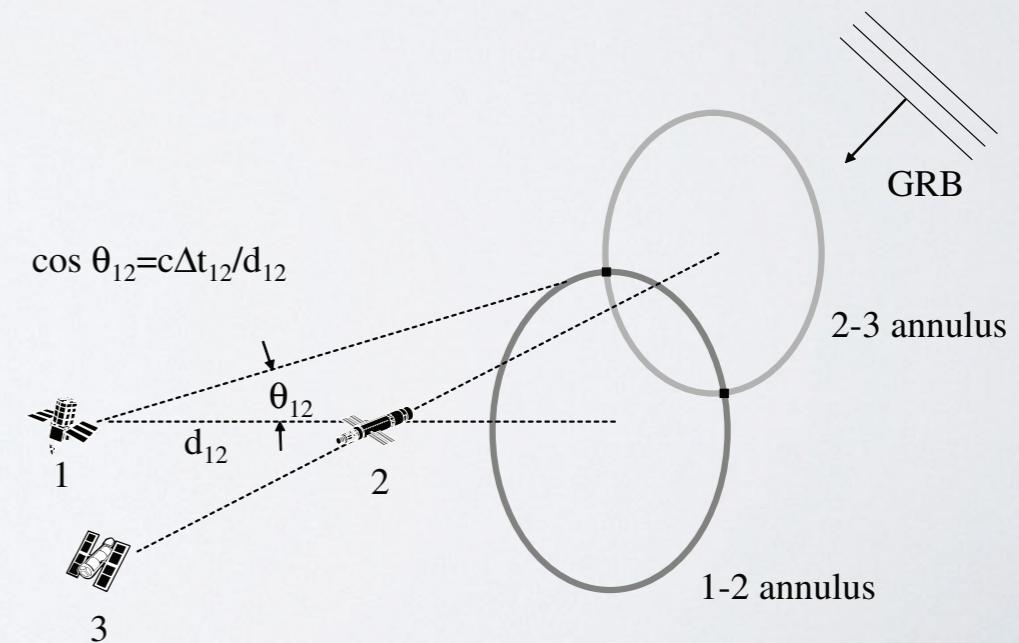
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Median-bright GRB at 45deg baseline
MoonBEAM average distance from Earth



Hurley et al. ApJS 207, 39 (2013)



MoonBEAM

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MoonBEAM localization of an average GRB
MoonBEAM + LEO instrument timing annulus
Combined posterior (loc area reduced by factor of 3)

