Seminarium Astrofizyczne

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GRBs redshifts inferred with machine learning and consequences on the GRB density rate.

Gamma-ray bursts (GRBs) can be probes of the early universe, but currently, only 26% of GRBs observed by the Neil Gehrels Swift Observatory GRBs have known redshifts (z) due to observational limitations. To address this, we estimated the GRB redshift (distance) via a supervised statistical learning model that uses optical afterglow observed by Swift and ground-based telescopes. The inferred redshifts are strongly correlated (a Pearson coefficient of 0.93) with the observed redshifts, thus proving the reliability of this method. The inferred and observed redshifts allow us to estimate the number of GRBs occurring at a given redshift (GRB rate) to be 8.47-9 yr -1 Gpc-1 for $1.9<z<2.3$. Since GRBs come from the collapse of massive stars, we compared this rate with the star formation rate highlighting a discrepancy of a factor of 3 at $z<1$.

Serdecznie zapraszam,
Margherita Grespan, on behalf of the SOC