APR11-2011-000756

Abstract for an Invited Paper
for the APR11 Meeting of
the American Physical Society

New Classes of Super-Luminous Supernovae

ROBERT QUIMBY, Caltech

Wide field optical imaging surveys are uncovering new classes of never before seen (or at least previously over-looked) stellar explosions. Of particular interest are a group of outbursts dwarfing the most powerful supernovae observed in the past century. With peak luminosities in excess of $10^{44}\,\mathrm{erg\,s^{-1}}$ and total radiative outputs greater than $10^{51}\,\mathrm{erg}$, these events push the limits of conventional supernova explosion theory. It is possible that some of these super-luminous supernovae are triggered by the electron-positron pair instability, and they may thus represent local analogs of the first stellar explosions to shape the universe. In this talk, I will highlight some of the key discoveries in this emerging class, preliminary event rates, host galaxy constraints, and the prospects for future studies.