



The Super-Chandrasekhar(?) Type Ia SN 2007if

Prof. Alejandro Clocchiatti

Instituto de Astrofísica, PUC, Chile

Adjunct Professor, University of Notre Dame Physics

Wednesday

August 22

4:00 P.M.

Rm 118 NSH

SN 2007if exploded in a low metallicity dwarf galaxy and due to its extreme brightness, red color, slow light curve evolution and low expansion velocities, was interpreted as a Super-Chandrasekhar mass supernova. Estimates of the nickel mass synthesized in the explosion based on scaling laws and simple structure models give values between 1.2 and 1.8 solar masses, inconsistent with the standard explosion scenario of a Chandrasekhar mass white dwarf.

Detailed comparison of the observational record of SN 2007if with those of normal Type Ia SNe suggests that the Super-Chandrasekhar scenario may not be correct. Even though the brightness of the SN is very high, the post-maximum light curve shape is fairly similar to those of normal Type Ia SNe and, as the object evolves, the spectrum converges towards those typical of Type Ia SNe as well. On the other hand, even though the scenarios leading to a Super-Chandrasekhar mass progenitor involve considerable degrees of asymmetry, VLT/FORS2 spectropolarimetric observations between 10 and 42 days after maximum show that the SN does not display continuum or line polarization.

I will review the observational record of SN 2007if, compare it with those of other SNe and conclude that scenarios different than the Super-Chandrasekhar one have to be analyzed in order to explain this SN