Shape of nebular emission line of core-collapse supernova exploded by neutrino heating mechanism

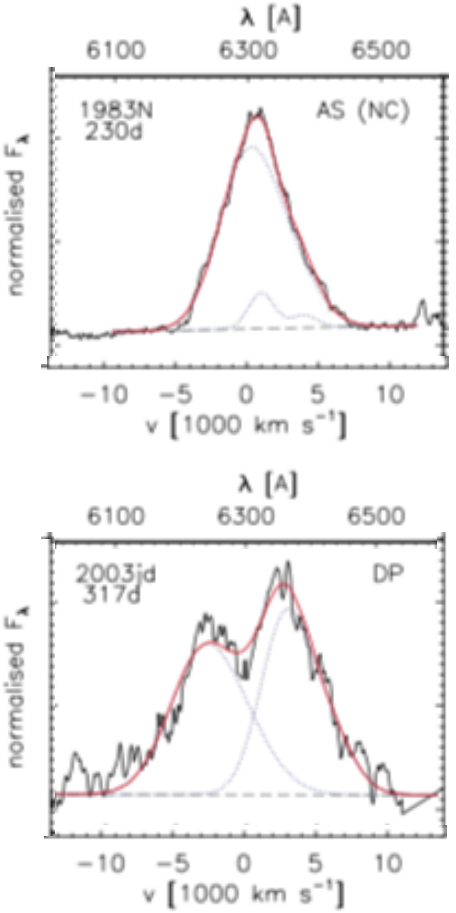
Yukari Ohtani[1], Ko Nakamura[2], Masaomi Tanaka[3] and Tomoya Takiwaki[1]
1: National Astronomical Observatory of Japan, 2: Fukuoka University, 3: Tohoku University

Purpose

Obtain information on the SN explosion mechanism

<= morphology of SN
<= profile of emission line in the nebular phase

- [O I] λλ6300 & λλ6364
- Mg I] λλ4571
- [Ca II] λλ7291



Single-peaked and Double-peaked O lines (Taubenberger+2009)

Key-point

- The calculation starts from a **self-consistent explosion model** (neutrino heating)

- => No assumptions in
  - progenitor mass
  - Eexp
  - θ-dependence of the energy injection
  - amounts of the synthesized nuclei

Results

Weak unipolar explosion

- either of a single- and a double-peaked [OI]λλ6300 + λλ6364 line can be formed

Strong unipolar explosion

- only one of either blue- or red-shifted component is formed.

Comparison with the observations is in progress.