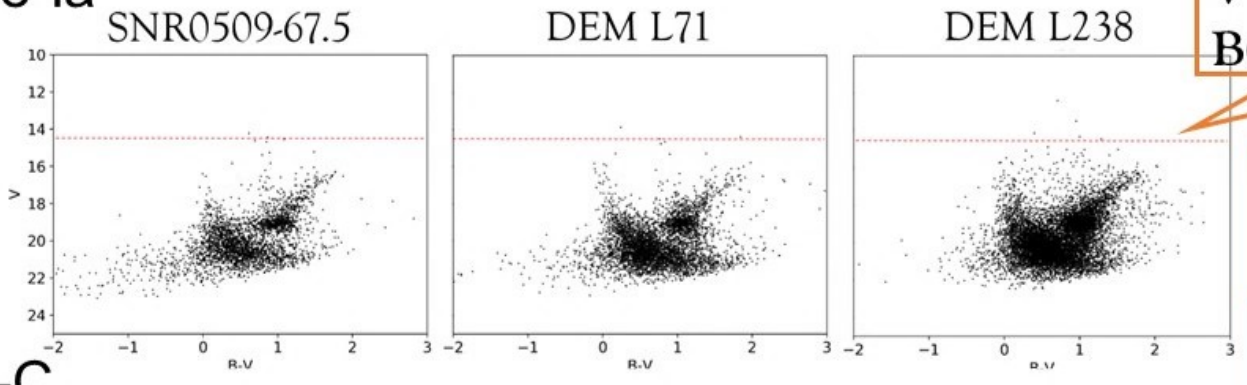
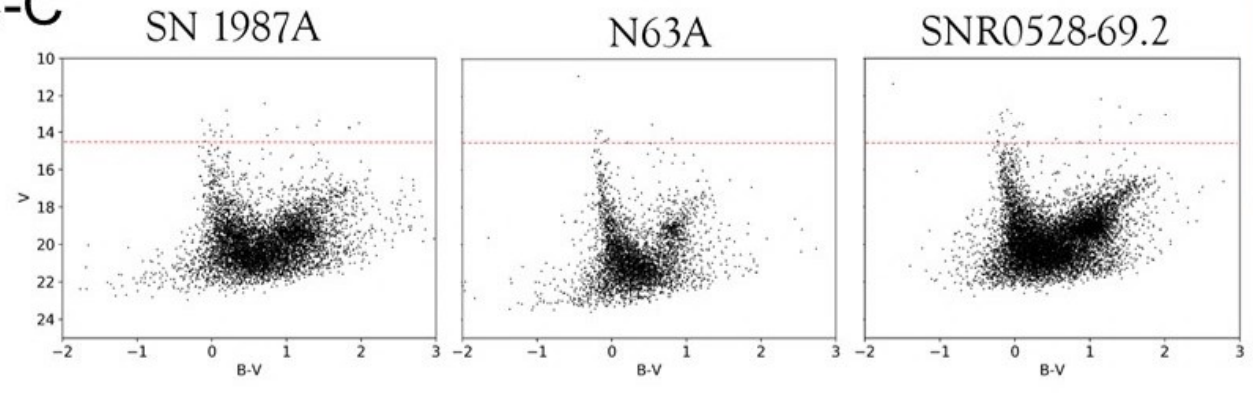
Properties of LMC SNRs: Stellar Environment

Type Ia

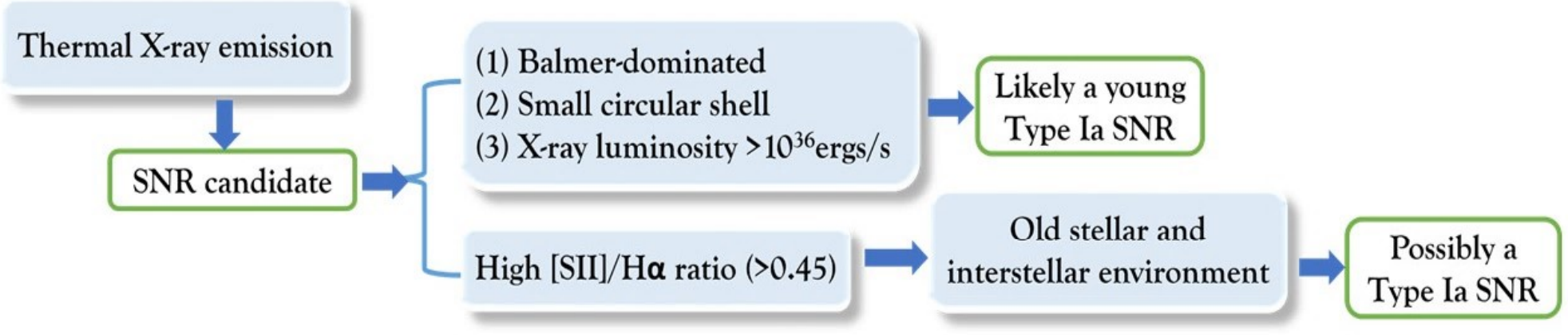


C-C



	Stellar environment
Type Ia	No OB stars within 50pc
C-C	Projected near OB stars

New Methodology for Identification of Type Ia SNRs in More Distant Galaxies



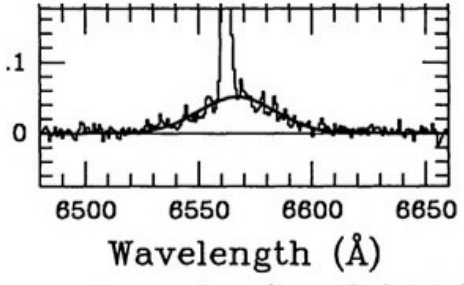
Multi-wavelength Characterization of Type Ia Supernova Remnants

Po-Sheng Ou[1,2], You-Hua Chu[1,2,3], Chuan-Jui Li[1,2]

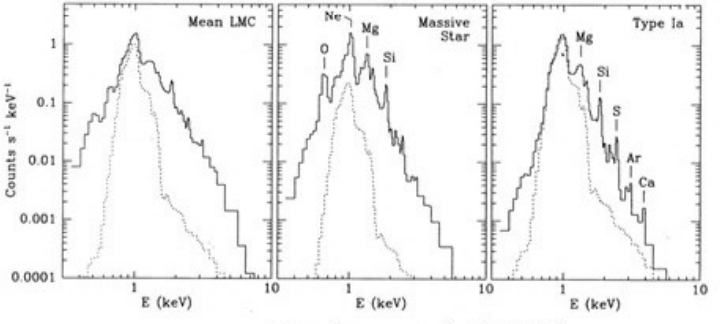
[1]Institute of Astronomy and Astrophysics, Academia Sinica, Taipei City, Taiwan
[2]Department of Physics, National Taiwan University, Taipei City, Taiwan
[3]Department of Astronomy, University of Illinois at Urbana-Champaign, Urbana, U.S.A.

Identification of Type Ia SNRs in Nearby Galaxies

- Balmer-dominated spectra
- X-ray spectra: enhanced abundance of Fe, Si, S, Ar, Ca
- Spectra of SN light echoes
- Old Stellar and Interstellar environment



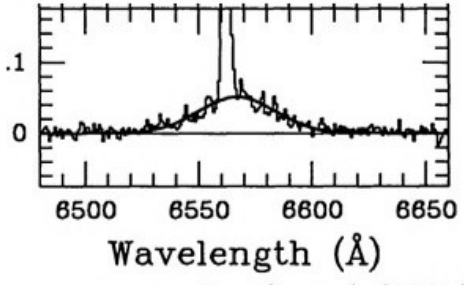
Smith et al. (1991)



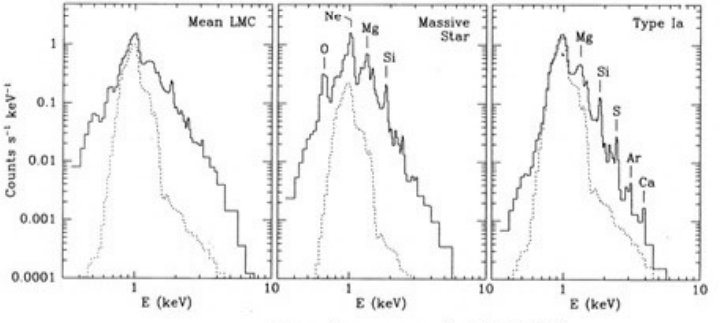
Hughes et al. (1998)

Identification of Type Ia SNRs in More Distant Galaxies

- Balmer-dominated spectra
- X-ray spectra: enhanced abundance of Fe, Si, S, Ar, Ca
- Spectra of SN light echoes
- Old Stellar and Interstellar environment



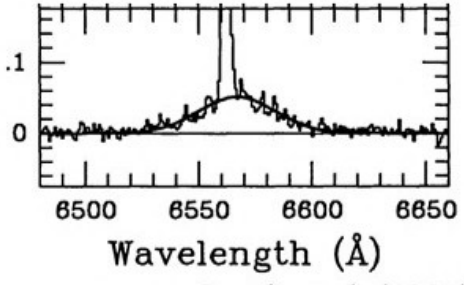
Smith et al. (1991)



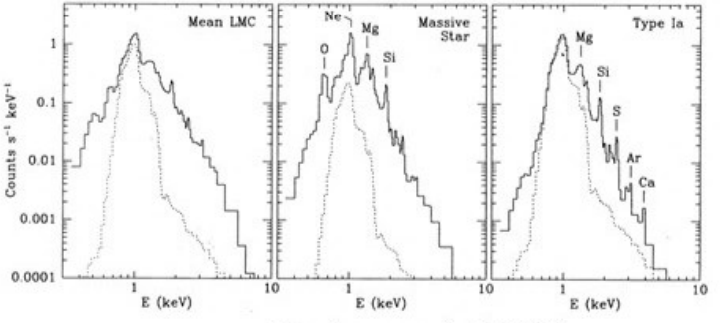
Hughes et al. (1998)

Identification of Type Ia SNRs in More Distant Galaxies

- **Balmer-dominated spectra** — Maybe feasible
- ~~**X-ray spectra: enhanced abundance of Fe, Si, S, Ar, Ca**~~ — Unfeasible
- ~~**Spectra of SN light echoes**~~ — Unfeasible
- **Old Stellar and Interstellar environment** — Feasible but less robust



Smith et al. (1991)



Hughes et al. (1998)

Properties of LMC SNRs: As a Training Set

In more distant galaxies

X-ray: only the brightest sources detectable

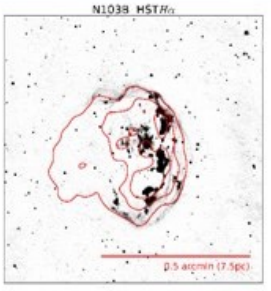
Radio: not effective

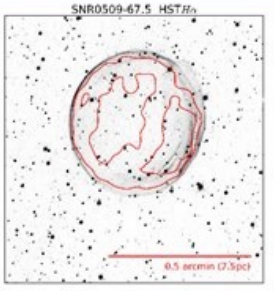
Optical: most sensitive/ effective

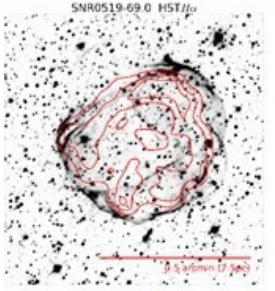
We examine optical and X-ray properties of SNRs in the LMC in order to apply them to more distant galaxies.

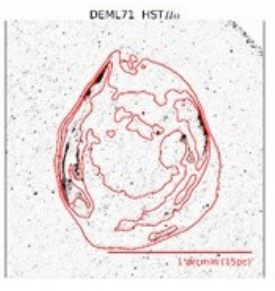
Properties of LMC SNRs: Optical Morphology

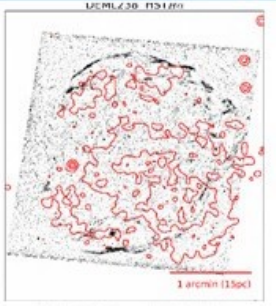
Type Ia



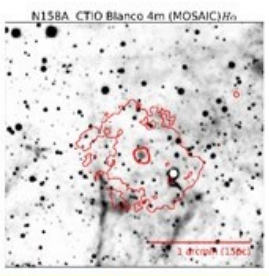


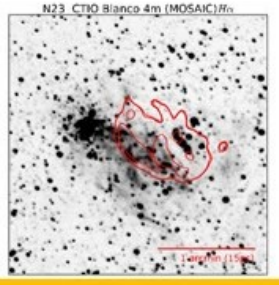


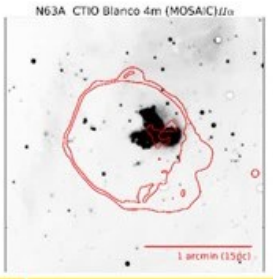


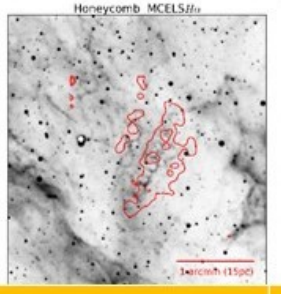


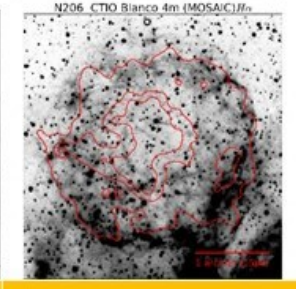
C-C





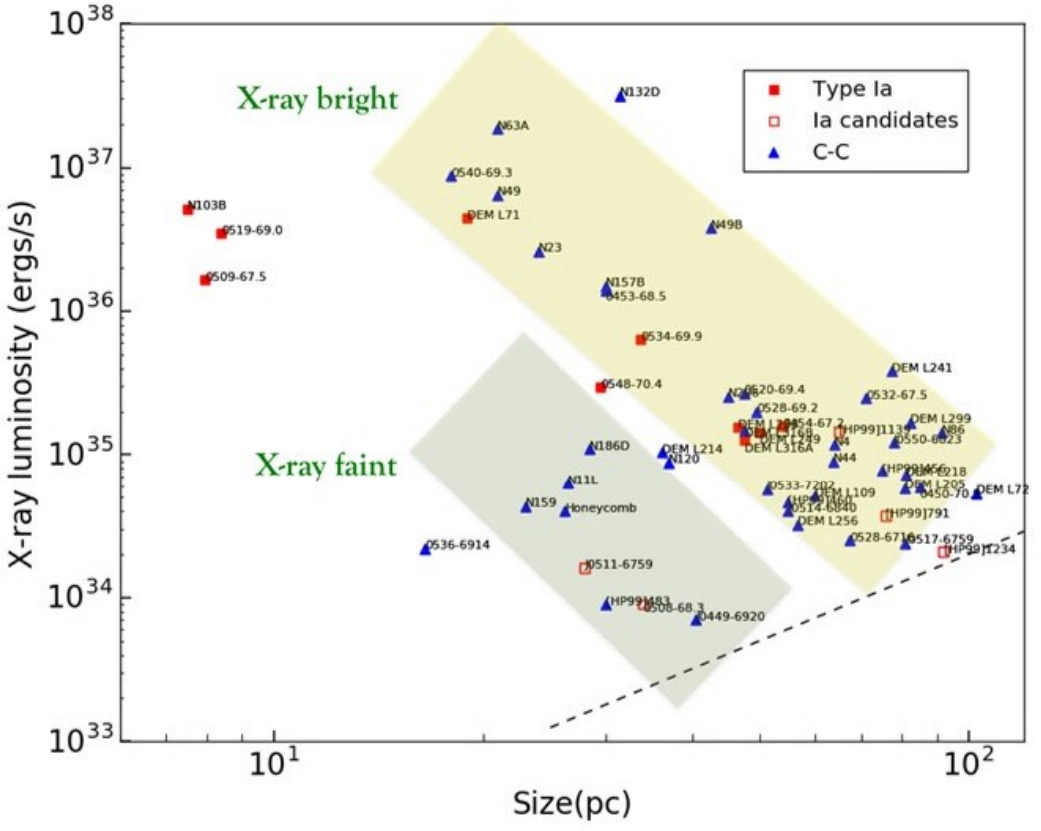






	Size	Shell	Sphericity
Type Ia	there exist very small ones (<15pc)	simple optical shell (uniform ISM)	Nearly round
C-C	lack of small ones (cavity explosion)	optical shells at late evolutionary stages	irregular

Properties of LMC SNRs: X-ray luminosity



- Small Type Ia SNRs $L_x > 10^{36}$ ergs/s