



ESAC 2017 JWST Workshop



NIRSpec IFU Observations of SN1987A.
Sarah Kendrew, Macarena Garcia Marin, Torsten
Boeker. Based on Margaret Meixner and Patrice
Bouchet GTO program

ETC hands-on Experience



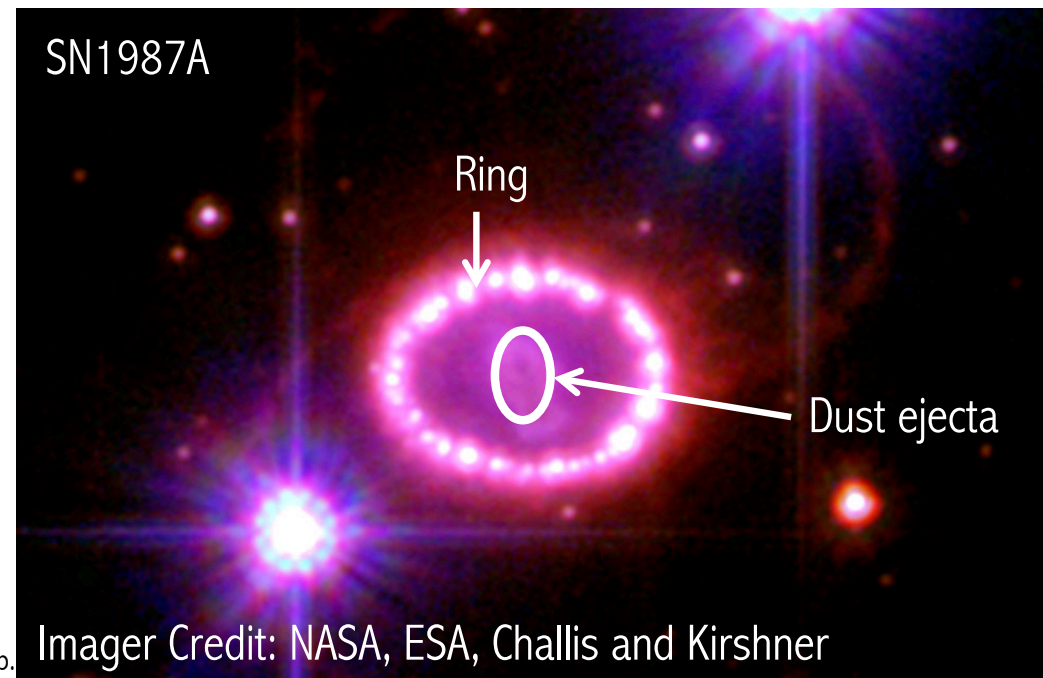
Overview



• **Background:** SN1987A is one of the best studied SN. It consists of a bright ring, enclosing the dust ejecta from the SNa. One challenge is to detect the ejecta without saturating the ring.

- Ring diameter ~ 1.1 arcsec, with thickness ~ 0.2 arcsec (the NIRSpec IFU covers a $3'' \times 3''$ FOV)
- Total emitting area ~ 1.7 arcsec².
- Ejecta occupy approx. 4 pixels, i.e. just-resolved.

Goal: Create an ETC workbook that estimates the exposure time needed to observe the SN ejecta and ring using the NIRSpec IFU.





Scenes and Sources



In the “Scene and Sources” you can create different sources and combine them to make an astronomical scene. Design two sources:

Source 1: Ejecta-alone: a point source centred at (0,0) with BB of 100K normalised to 0.1 mJy at 10 μ m

Source 2: The ring alone

An extended flat-profile source, radius 0.638”, with BB spectrum of 400K, normalised to 80 mJy at 10 microns.

Combine the two sources to set up a scene.





Calculations



G235M/F170LP setting (medium resolution)

- Use the ring + ejecta scene
- Pick 2.12 μm in the strategy tab, representing the H2 line. We don't actually have the line strength, so for line observations the SNR may be higher.
- Choose readout mode NRSIRS2 (more information in JDocs), 4 exposures of 30 groups 1 integration. The number of exposures will be equivalent to the number of dither positions in APT.
- Think about your background subtraction strategy: do you need an off-source background? In-scene background subtraction?

Use the same detector configuration to cover the NIRSpec wavelength range using :



G140M/F100LP

G235M/F170LP

G395M/F290LP