

## Notes for ETC tutorial – SN1987A

Diffraction limit:

- 12.8  $\mu\text{m}$ : 0.41 arcsec ([NeII])
- 24.3  $\mu\text{m}$ : 0.7 arcsec ([NeV])

### Scenes & sources

- SN1987A Spitzer IRS: an extended disk, radius 0.638". Flat flux distribution. 5-30  $\mu\text{m}$  only.
- Simplified SN scene: extended disk (ring) as above + central point source (the ejecta). Modelled as blackbody sources: ring at 400K, ejecta at 100K. Normalised to 80 mJy at 10  $\mu\text{m}$  and 0.1 mJy at 10  $\mu\text{m}$ , respectively.
- SN1987A, ejecta only: the central point source only, BB with T=100K, normalization as above.

### Key to calculations

8: MIRI imaging

- F560W
- Spitzer spectrum
- 0.06" aperture radius
- background 0.7-0.9"

13: MIRI imaging

- F1000W
- Simplified scene ring + ejecta
- 0.06" aperture radius
- offset 0.4, 0.4" to get the ring

14: MIRI MRS

- Ch3 short, 12.8  $\mu\text{m}$  [NeII] line
- Spitzer spectrum
- Nod off scene
- Aperture radius 0.3"

12: MIRI MRS

- Ch4 medium, 24.3  $\mu\text{m}$  [NeV] line
- Spitzer spectrum
- Nod off scene
- Aperture radius 0.3"

16: MIRI Imaging (+19-22 batch expansion)

- Ejecta only scene
- F2550W filter

- Calcs 19-22 batch expanded over integrations 4-8
- Aperture radius 0.4", background 0.7-0.9

17: NIRSpec IFU

- Simplified scene ring + ejecta
- G235M/F170LP
- Nod-off scene
- Aperture radius 0.05", offset 0.4, 0.4" position

18: NIRSpec IFU

- Ejecta only
- G395M/F290LP
- Nod-off scene
- Aperture radius 0.3"