SiO Maser Movies: The Re-Run

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Introduction

Improve model in Gray+ 2009MNRAS.394...51G

i) Sperical RT replaces LVG: no more 'blobs'

ii) 3 isotopologues of SiO linked by line overlap

iii) Physical data from CODEX models (o54 jobs)

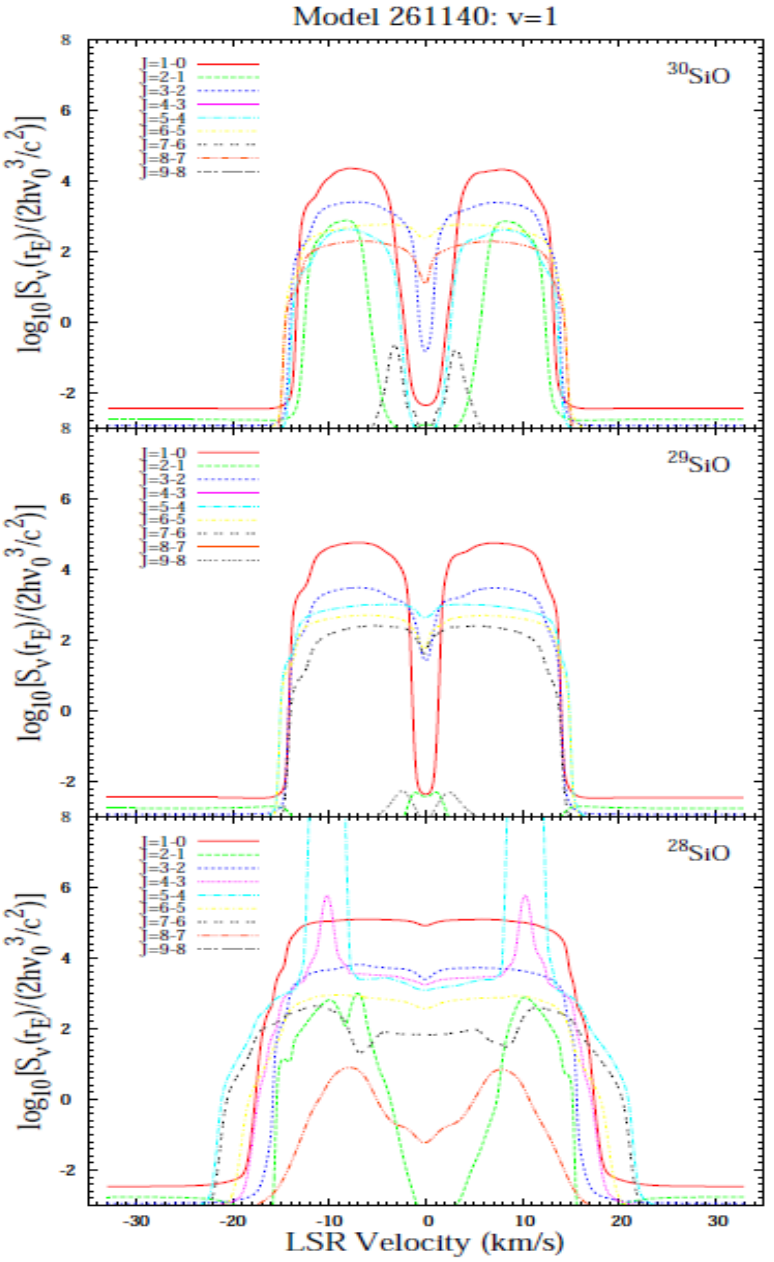
Ireland, Scholz, Wood, 2011MNRAS.418..114I

iv) Several stellar cycles available

v) New dust model: CODEX self-generates grains

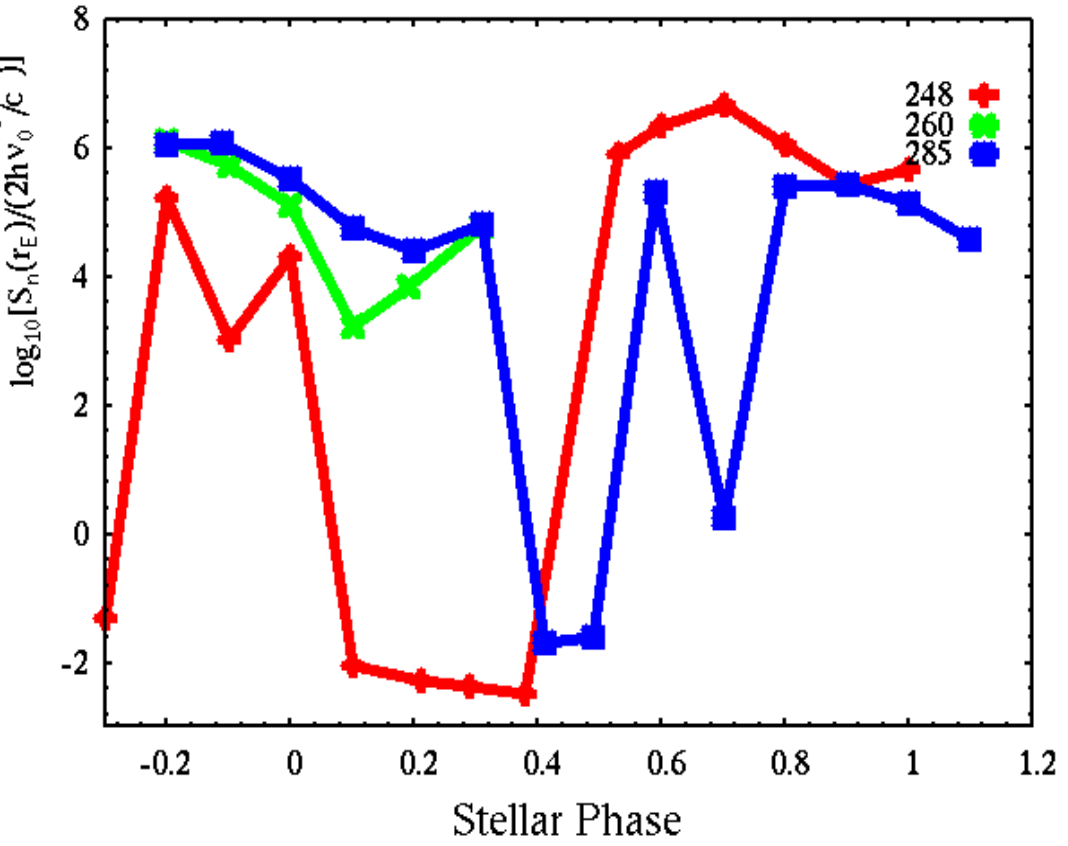
Results: Synthetic Maser Spectra

- o54 model data:
- Mass 1.1 solar
  L = 5400 solar
  Metallicity 0.02
  R_p = 216 solar
  P = 330 days
- Roughly like oCet
- 3 samples, > 1 P
- Model 261140 at phase 0.0 (optical maximum)

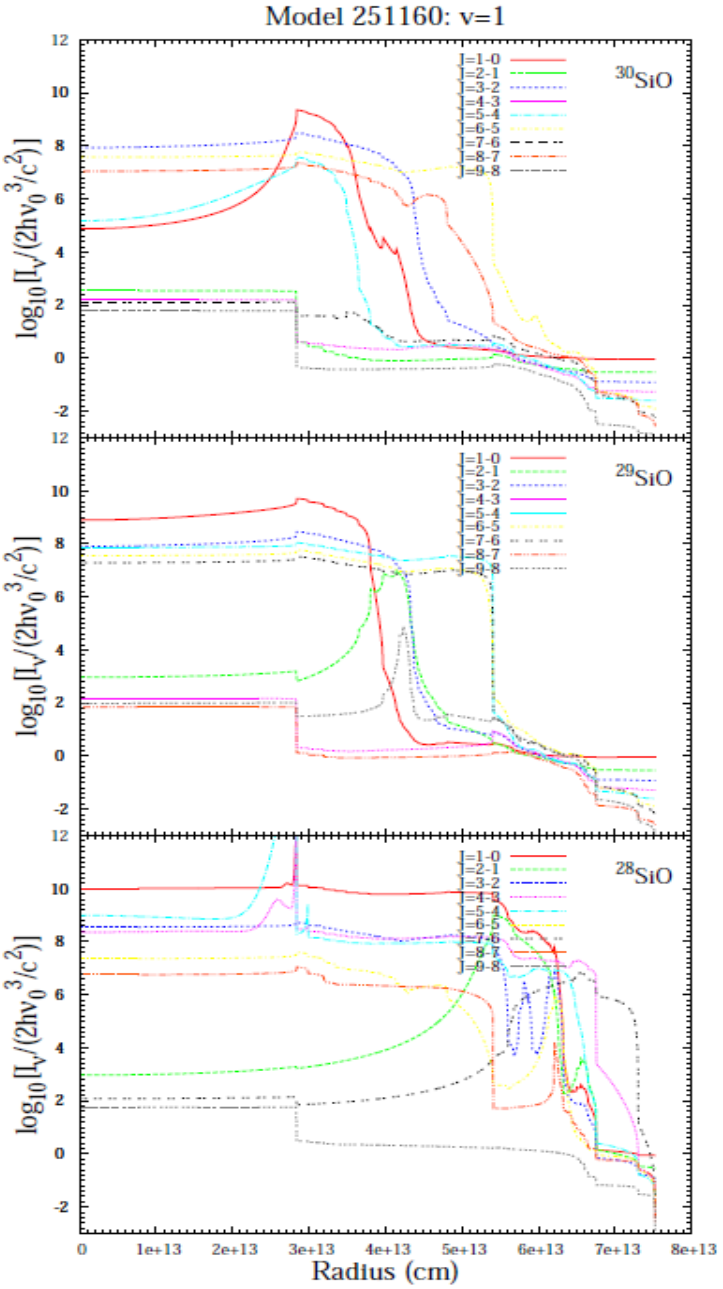


Maser Light Curve

- Model cycles have varying properties – like real AGB stars
- Masers follow optical curve (on average) with delay < 0.1P
- In the model, might average to observed pattern over many xP
- Low values too low?

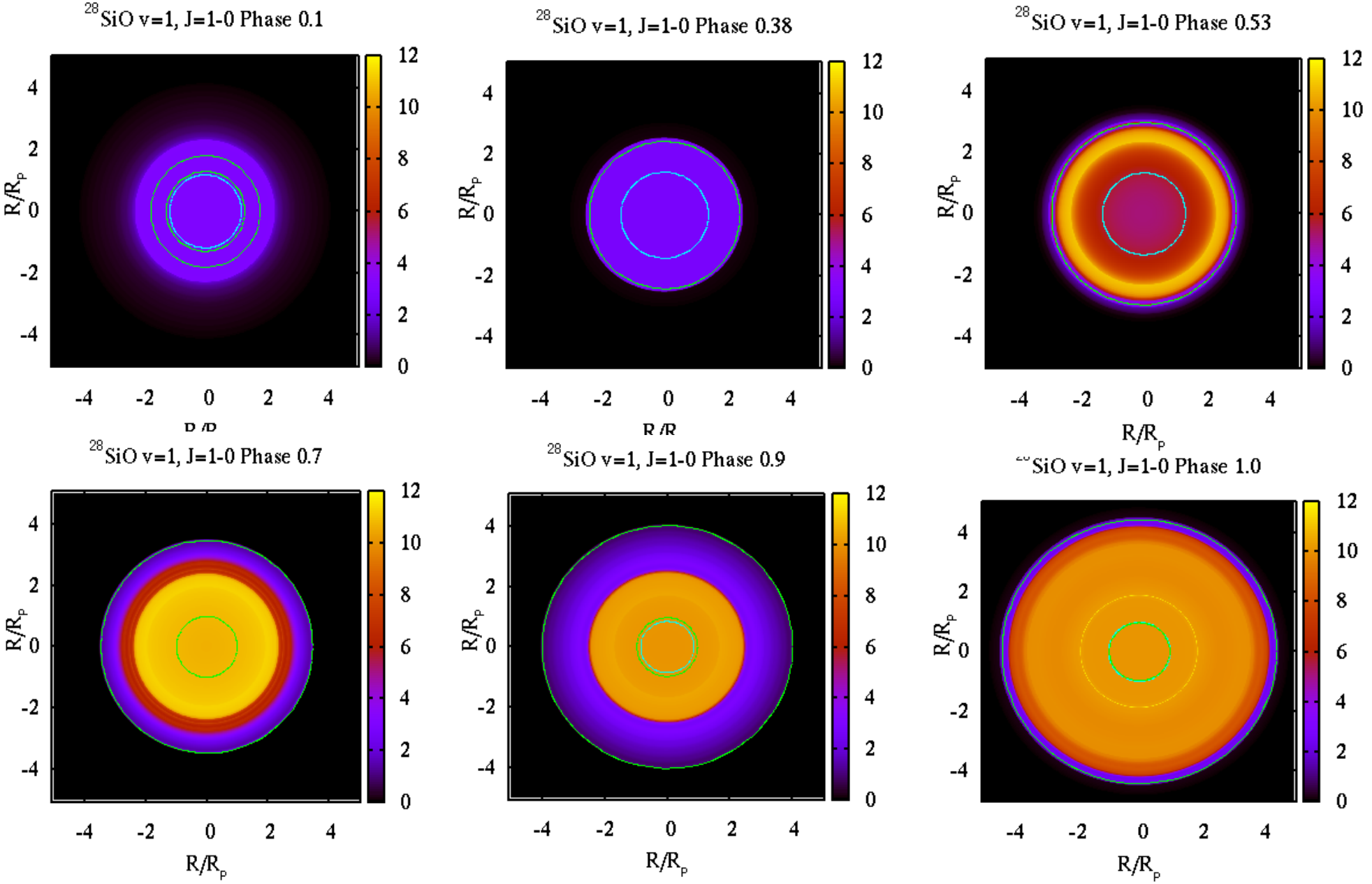


Intensity Profiles



- Phase 1.0 (opt max)
- R=1.44(13)cm
  R(S3) = 1.46(13)cm
  R(S2) = 6.64(13)cm
- Outer shock S2 is doing something; inner shock S3 negligible
- Spikes near 2.8(13)cm nothing to do with shocks or optical/NIR photosphere

Synthetic Images ('VLBI')



Discussion

- Shocks not consistent (as in real stars)
- Outward-moving shock crosses zone in 1P: forms outer edge of maser zone
- Brightest ring emission **not** related to shocks
  - closest association near phase 0.5
- Phase-mixing in real stars: averaging
- Ring emission follows high opacity (in mid-IR) layers.

Movie: Series 248, v=1, J=1-0