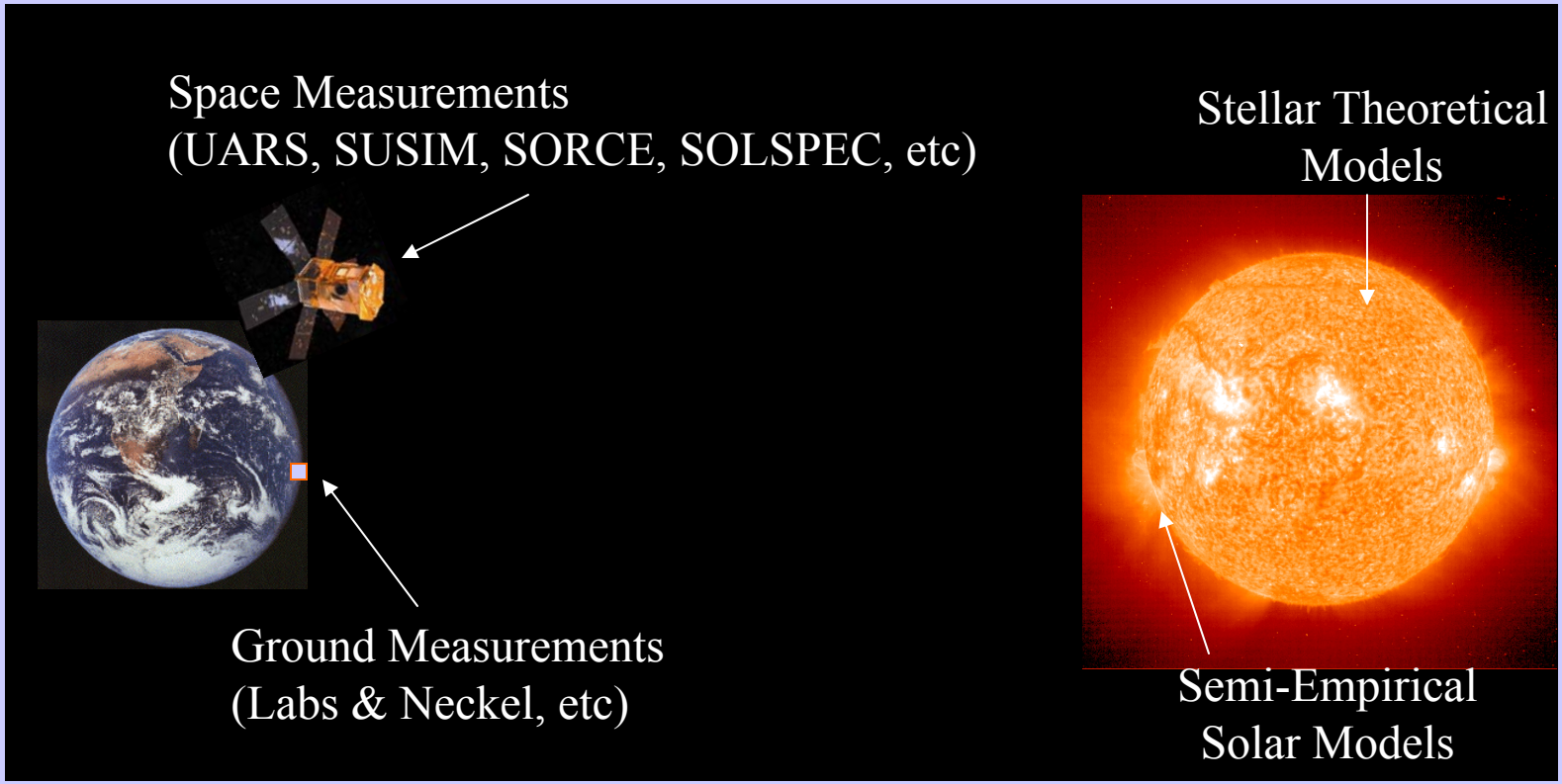
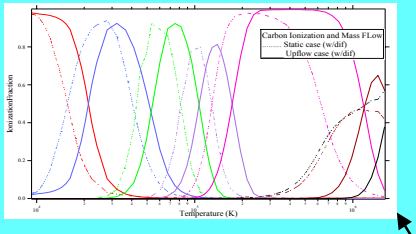
Spectral Solar Irradiance Sources



|-------- Solar Radiation Physical Modeling (SRPM) ---------|

Seeks not to replace these, but rather to integrate them in a consistent physical model that matches the observations.

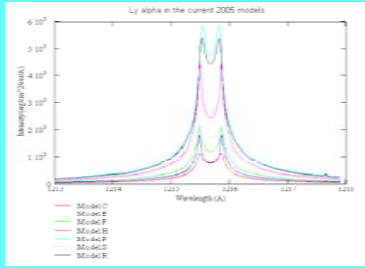
SRPM Flow Scheme



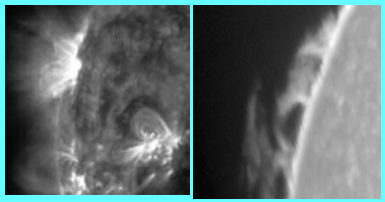
$n_{lev}, n_{ion}, \ldots(x,y,z,t)$

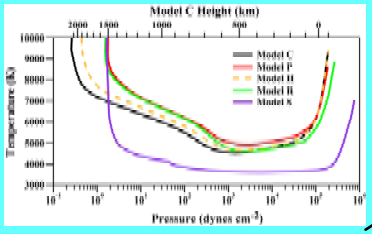
Intermediate Parameters

Emitted Spectrum



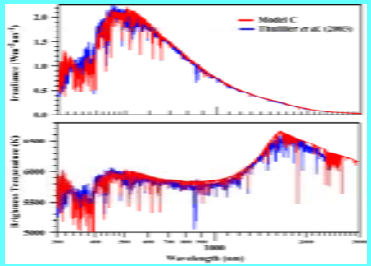
$I(\lambda,\mu,\varphi,t)$





Physical Models & Processes

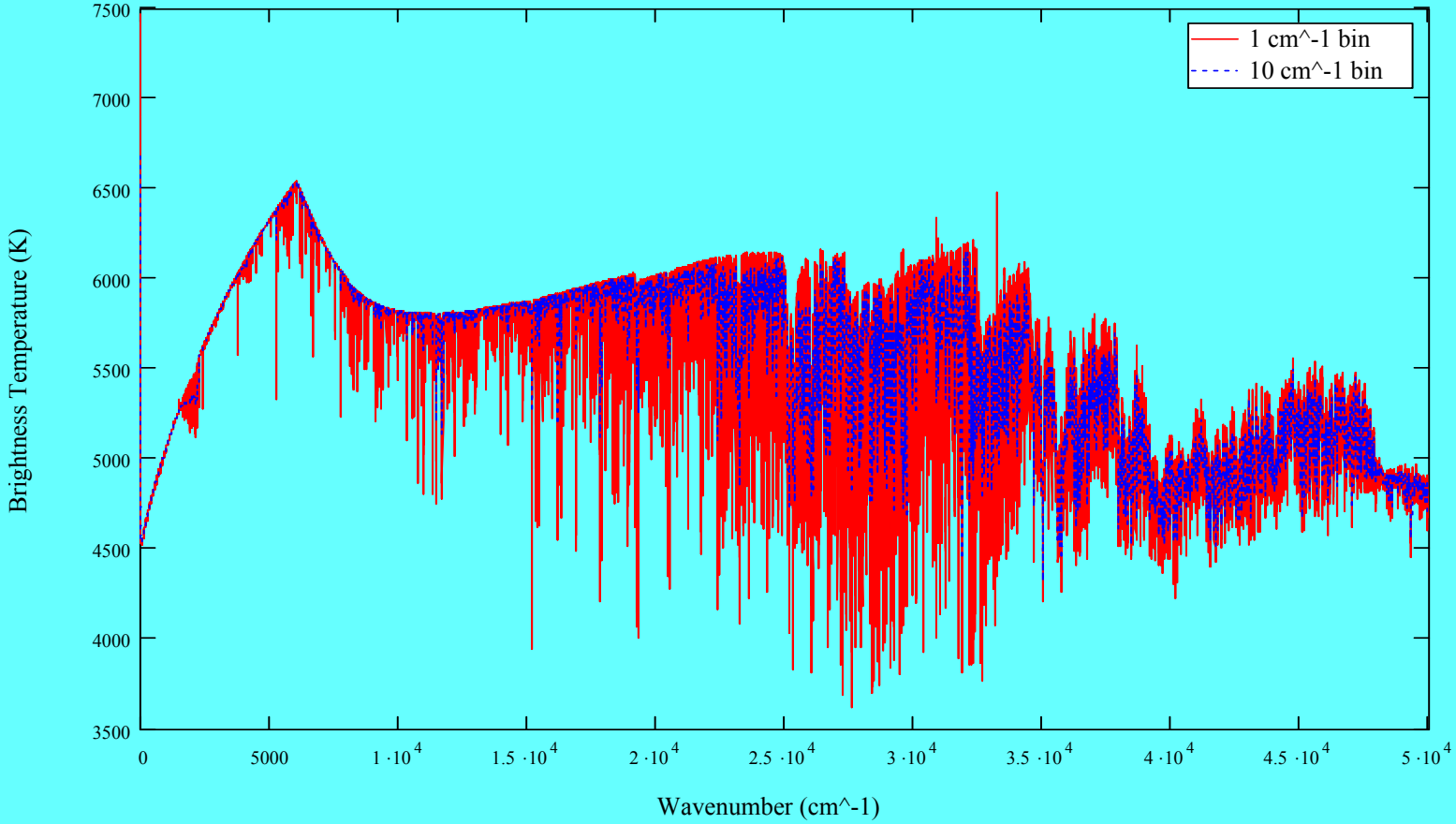
Observed Spectrum



$T, ne, nh, U, \ldots(x,y,z,t)$

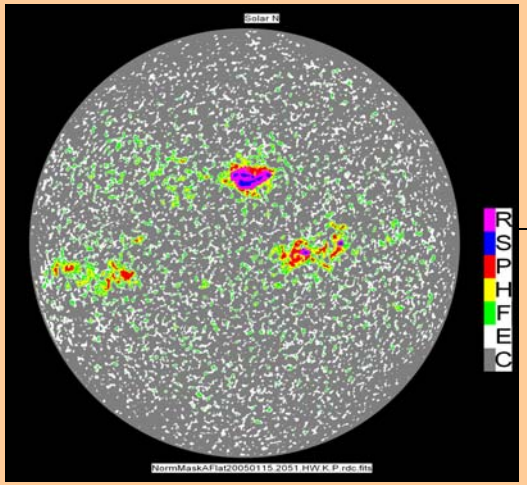
$I(\lambda,\mu,\varphi,t)$

New Reference Spectrum (Quiet Sun)

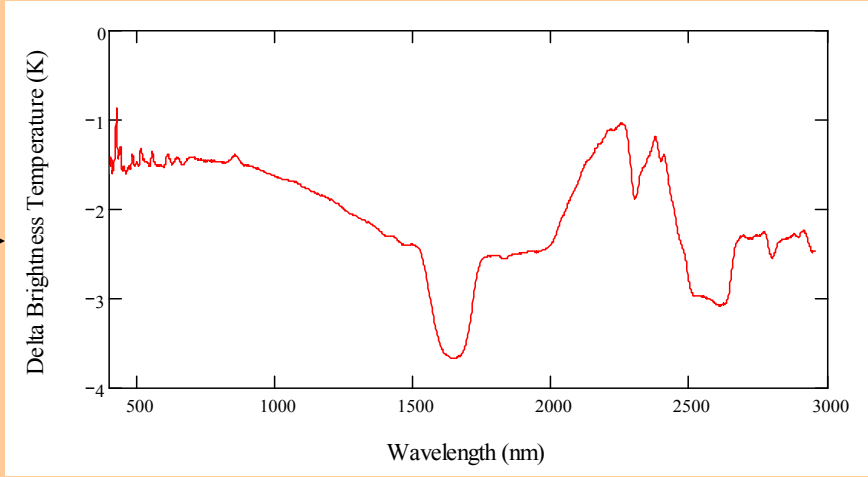


- Option in MODTRAN at 0.01 to 10 cm^{-1} bins
- On AER web site at full resolution

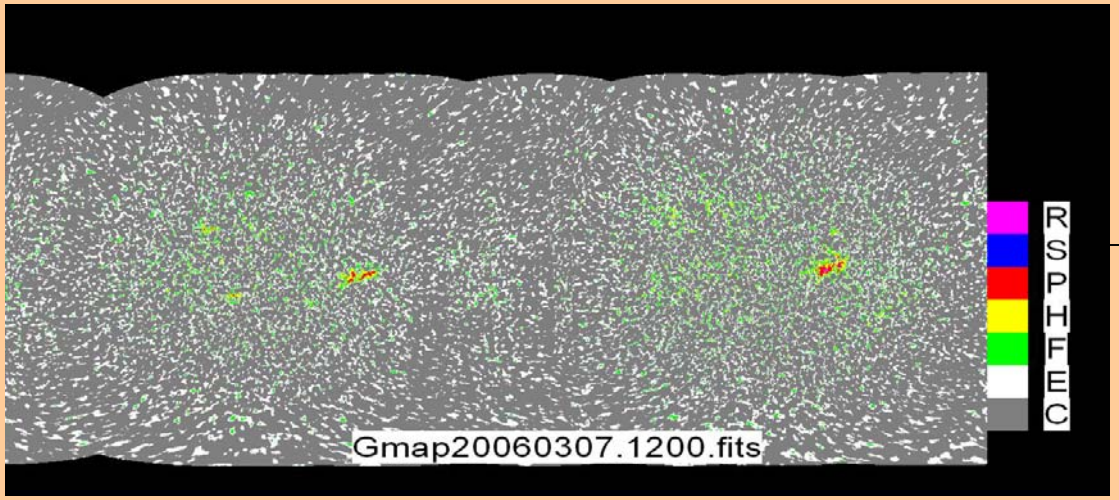
Irradiance & Features on the Sun



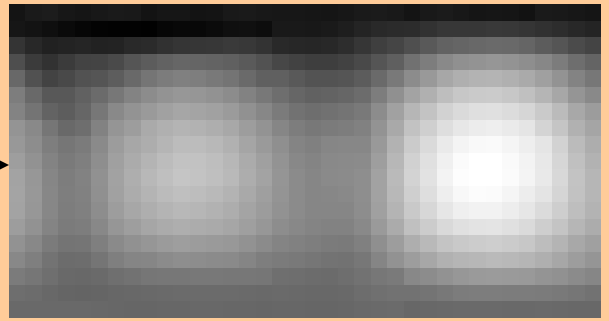
Daily solar disk mask



Brightness temperature daily variation



Synotic mask of the whole Sun



Lyα flux
around the Sun

Next Steps

- **Improve visible & IR continuum**:
  - Tune the model photospheres to fox the 3% excess
  - Keep updating the atomic data with NIST V3.0
  - Extend non-LTE to more species (e.g. Mg, Fe)

- **Extend SRPM to the UV**:
  - Develop better model chromospheres
  - Non-LTE for all species

- **Extend SRPM to the EUV and XUV**:
  - Develop model corona and transition region
  - Consider more ionization stages

References

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