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## The puzzle of protoplanetary disk masses

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Propositions accompanying the thesis

## The puzzle of protoplanetary disk masses

- i. CO isotope-selective photodissociation needs to be properly considered in disk modeling to infer accurate gas masses. (*Chapter 2*)
- ii. Disk gas masses can be inferred by a combination of  $^{13}\text{CO}$  and  $\text{C}^{18}\text{O}$  total intensities, although with some uncertainties. (*Chapter 3*)
- iii. Fast chemical evolution rather than low gas-to-dust ratios is likely the cause of the low CO-based disk gas masses in Lupus. (*Chapter 4*)
- iv. The slope of the surface density distribution can be traced by low- $J$   $^{13}\text{CO}$  line emission, but only in specific disk regions. (*Chapter 5*)
- v. HD far-infrared emission lines from disks should be considered as an important science goal for future far-infrared missions.
- vi. The existence of Jupiter and its particular orbit make that the Solar System is not a typical case compared with observed exoplanetary system architectures.  
(Morbidei & Raymond 2016, *Geophys. Res.*, 121, 1962)
- vii. Running models teaches you that extraordinary claims require extraordinary causes, as well as an extraordinary high number of checks.
- viii. Studying CO isotopologues is often considered as complicated chemistry by astronomers, but it does not even fall under “chemistry” for astrochemists.
- ix. Finding the unexpected in a dataset can be as exciting as finding the confirmation of what was expected.
- x. In life, as in science, an error can be an opportunity to learn something new.
- xi. Combining motherhood with a PhD is often seen as a heroic act: this demonstrates that not enough has yet been done for true inclusion of women in science.
- xii. All astronomers should stare at the sky on a new moon night in Paranal at least once in their lifetime. This brings back the original astonishment in front of the beautiful unknown and provides renewed motivation to study a single detail as part of the bigger picture.

Anna Miotello  
Leiden, March 7<sup>th</sup> 2018