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## Molecules during Stellar Formation and Death

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# Propositions

accompanying the Ph.D. Thesis

## Molecules during Stellar Formation and Death

1. The transition from N to N<sub>2</sub> happens closer to the cloud edge than previously known. *Chapters 2, 3 and 4*
2. The reported detection of interstellar N<sub>2</sub> is questionable. *Chapter 2*  
*Knauth et al. 2004, Nature, 429, 636*
3. It is easier to predict accurate radii of peak abundances for daughter species in AGB envelopes than the corresponding column densities. *Chapters 3 and 4*
4. State-selective reaction rates of OH + H need to be included in astrochemical models of shocks and disks. *Chapter 5*
5. The mass of the small dark cloud CB 17 is higher than reported previously. *Lemme et al. 1996, A&A, 312, 585*
6. Interactions between molecules and bare grains may be more important than reactions with icy surfaces in the envelopes of evolved stars.
7. Isotope selective photodissociation of molecular nitrogen tells the same story as that of carbon monoxide.
8. The nature of the universe might be quantum.
9. Pingpang and Taichi help not only in staying healthy, but also in understanding molecular collisions and stellar evolution.
10. The capability of working in collaborations becomes more and more important nowadays.
11. There is a balance between deadlines and the creative process.
12. The only constraint to scientific achievements is the human being imagination, at least in the field of astrochemistry.

Xiaohu Li  
Leiden, February 2015