

## A brief guide to cold (neutral) molecule formation methods...

- Assemble ultracold atoms:
    - Photoassociation  $T \ll 1\text{mK}$
    - Magnetoassociation
  - Create stable molecules in (a single) excited level
  - Transfer to the absolute ground state: adiabatic transfer (STIRAP), shaped laser pulses,...
- OR
- Slow down preformed molecules with external time varying electric or magnetic fields through their intrinsic dipole moments, or via collisions with a buffer gas  $T > 1\text{mK}$
- OR
- Let atoms stick together on/in helium nanodroplets  $T \sim 1\text{K}$
- OR
- Laser-cool species with suitable properties (SrF, YO,...)  $T \sim 1\text{mK}$
- OR
- ...

See recent review articles: Carr, DeMille, Krens, Ye, New J. Phys. 11, 055049 (2009),

Dulieu & Gabbanini Rep. Prog. Phys. 72, 086401 (2009)

See recent special issues: PCCP 13, 18703 (2011); Chemical Review 112, 4801(2012)