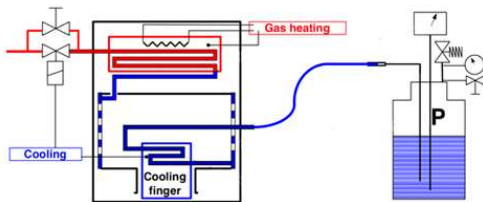


## Continuous Flow Cryostats

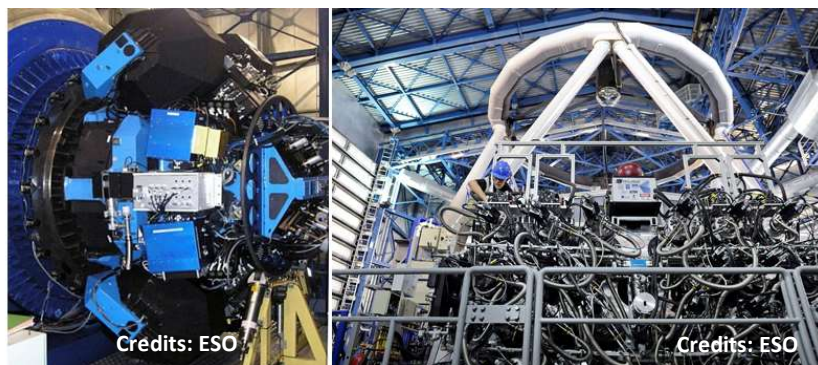
**Continuous Flow Cryostats (CfCs)** are cooling systems, first developed by ESO, based on an automatic refilling (using a continuous circulation of LN2) with the following advantages:

- They are **more compact, lighter and smaller** than traditional LN2 bath cryostats
- They have **less associated vibrations** than standard cooling systems, ideal for stable environments
- They **do not require daily human intervention**, thus improving **maintainability**
- They behave safely in case of **power failure**
- Control solution based on **Beckoff PLC**

CfCs allow the temperature within an instrument to be changed from room temperature  $\sim 290$  K to  $\sim 80$  K



Lizon & Accardo, Proc. SPIE, 7739, 2010



### Applications for Astronomy

- **High resolution spectrographs** are the most obvious applications being very sensitive to any sort of disturbances (i.e. **UVES, HARPS, CARMENES, ESPRESSO**)
- **Nasmyth rotating instruments** offering a constant weight and not affecting the instrument from any change of gravitational load as traditional bath cryostats (i.e. **NACO** and **VIMOS**)
- **Multiple detector systems** as those that combines several spectrographs (i.e. **MUSE**) making maintenance easier

### ESO Agreement

ESO signed an agreement to license its cooling system technology to our company **FRACTAL S.L.N.E.** to deliver products making use of this technology.

ESO News 9 June 2015 <http://www.eso.org/public/announcements/ann15041/>

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