

Concluding remarks

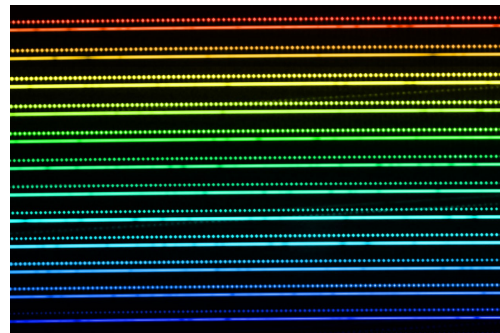
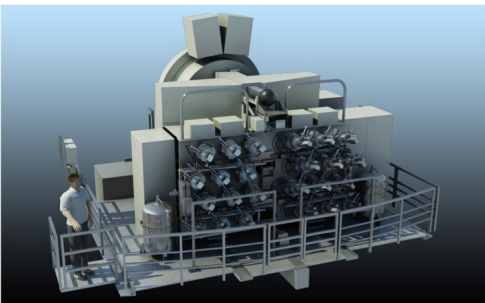
Suzanne Ramsay

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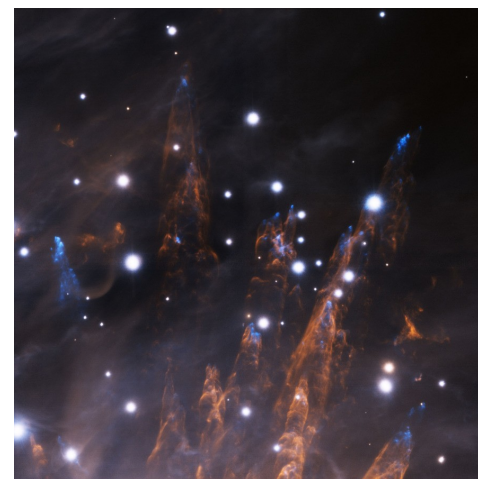
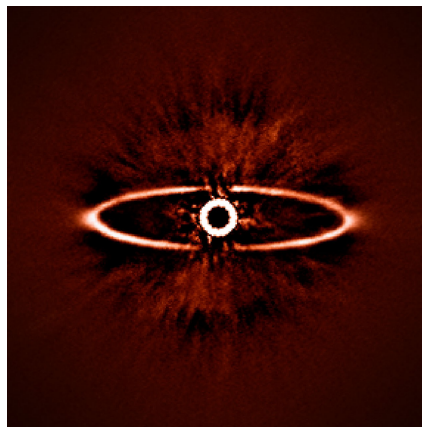
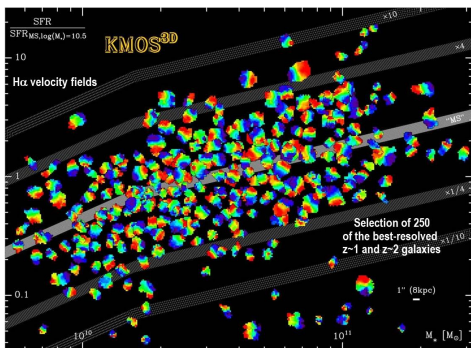
E-ELT Instrumentation Project
Manager



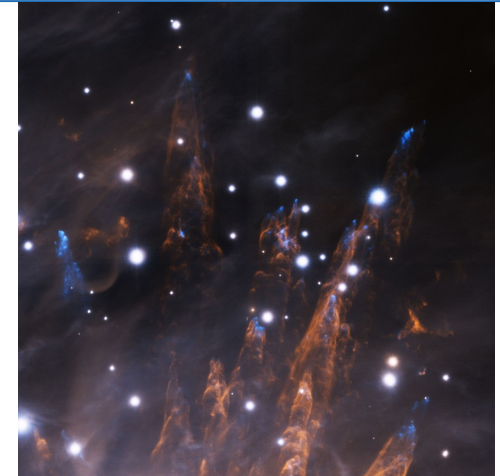
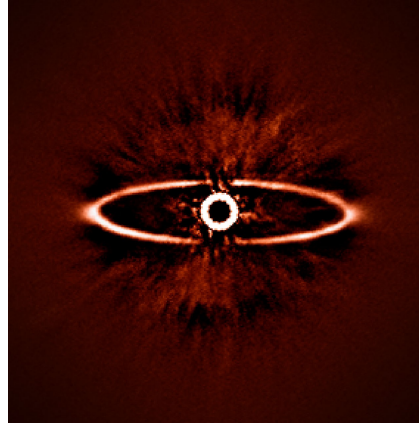
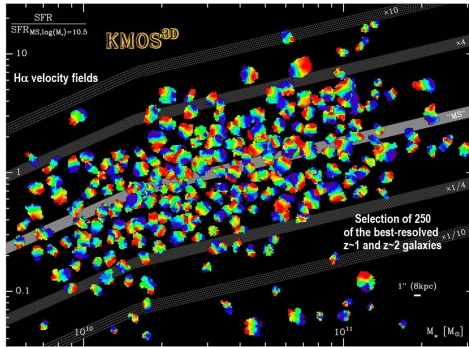
Inputs and outputs



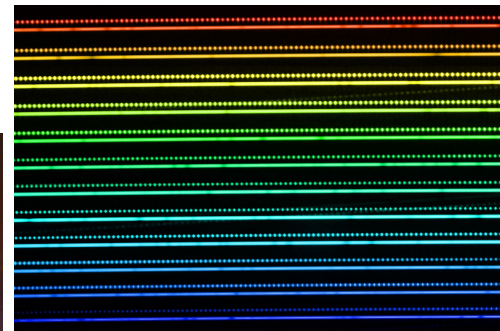
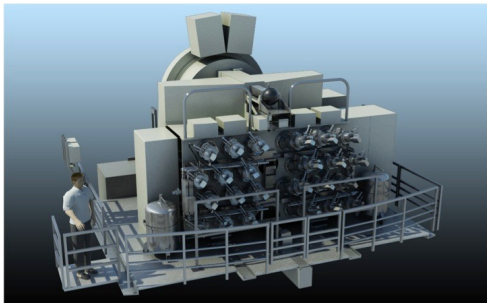
CALIBRATE!



Inputs and outputs



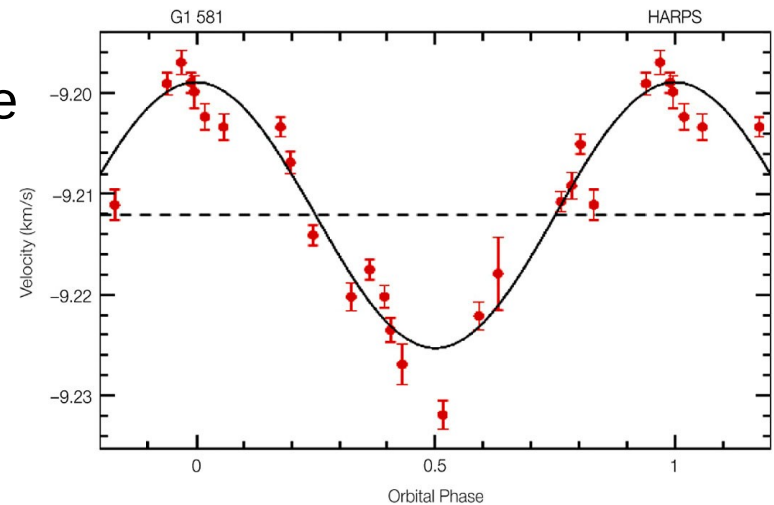
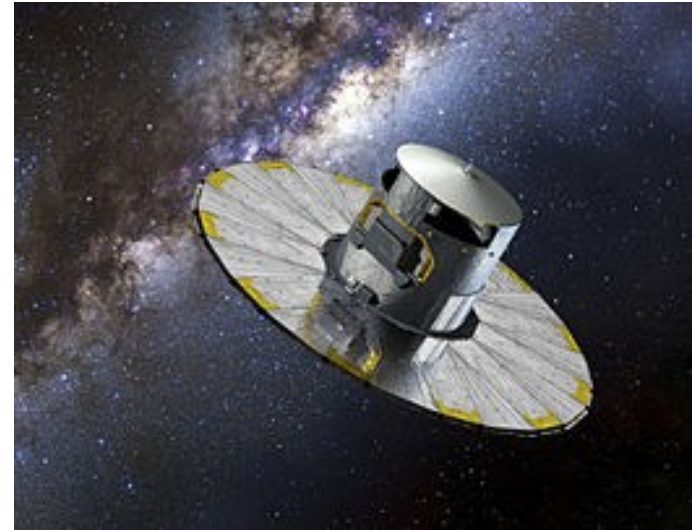
CALIBRATION reqs



Calibration reqs

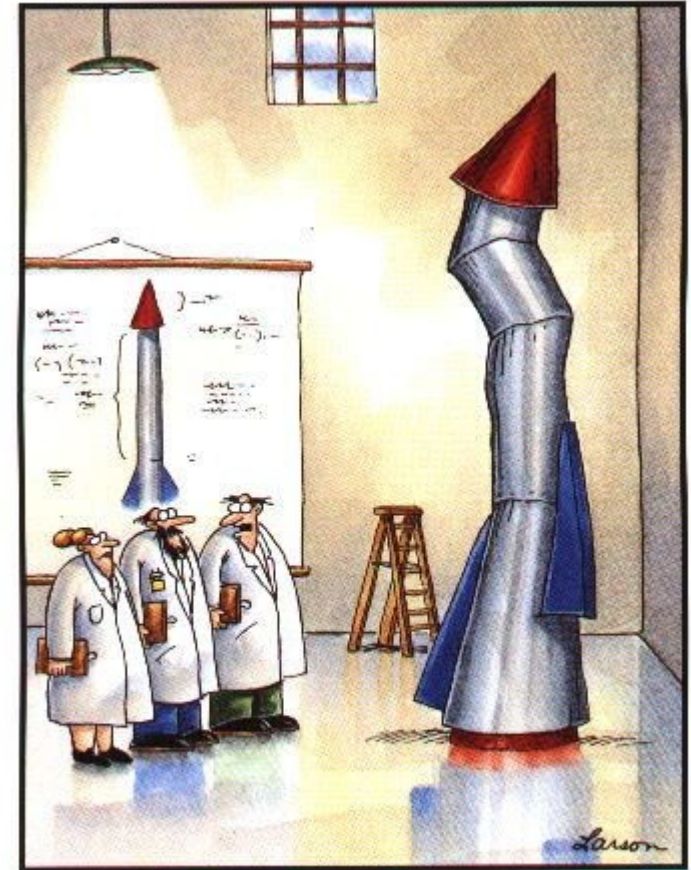
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- “Single science case” instruments the level of calibration required is clear
- Requirements for “Workhorse” instruments?
- Be clear about the level of performance expected
- Don't try to answer every science case
- Provide tools?



Calibration is the last refuge of the scoundrel

- Calibration as a tool to fix hardware issues
- Can we avoid this by improving instrument design?
- Can we relay on physical models of instruments?
 - Instrument and detector design improves, but we typically more ambitious



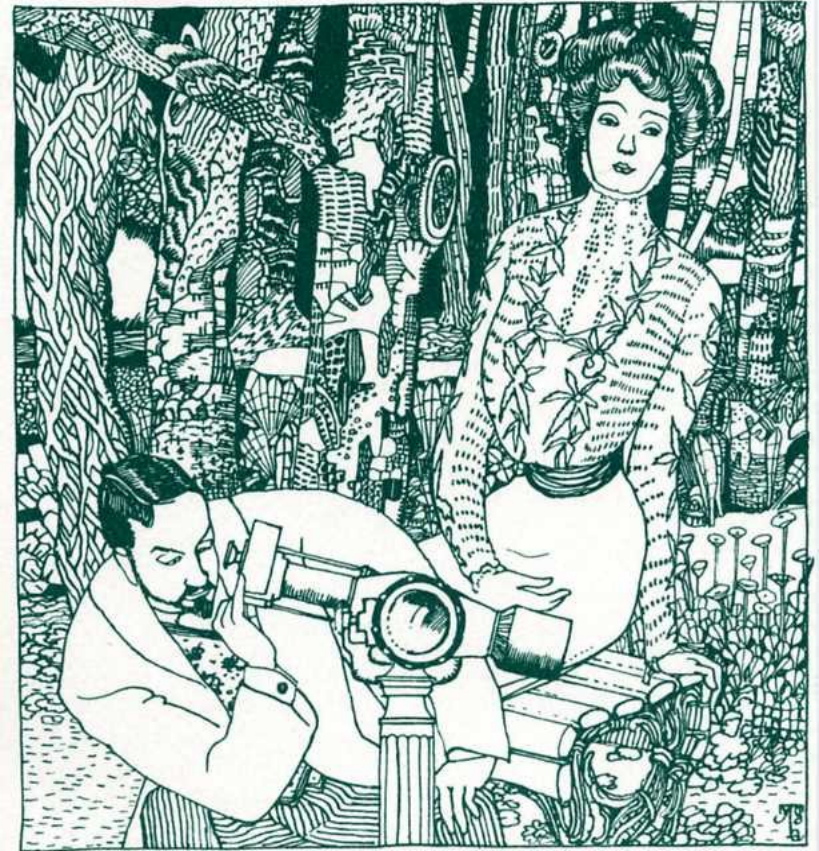
"It's time we face reality, my friends. ...
We're not exactly rocket scientists."

- Everything changes!
 - Lamp lines
 - Instrument stability
 - Atmospheric properties
 - Star positions.....
- Calibration plans are living things
 - Assess, rewrite, scrutinise
 - Validity times, evolution
- New tools to reduce calibration overheads
 - Molecfit, better understanding of the atmosphere
- Make the metrology/calibrations easily available!
- Are we not ambitious enough?
 - Time spent on sky-subtraction in the NIR



Interaction with the users

- This is a key input to our pipelines and calibration plans
- Non-reducible data >> no science return
 - Complex instruments demand complex pipelines and a reliable calibration plan is a necessary pre-cursor
- There is no better way to understand the instrument than by trying to understand your astrophysical problem



The Astronomer, ink drawing by Gyula Tichym 1910.

- Prepare and respond to LSST and GAIA
 - New survey spectrographs MOONS, 4MOST
- New instruments on 40-m class telescopes
 - Near infrared imaging at $50\mu\text{arcsec}$ ($10\mu\text{arcsec}$ goal)
 - Radial velocities at cm/s levels, decade timescales

