



MULTI-OBJECT SPECTROSCOPY IN THE NEXT DECADE

Marc Balcells, ING

El Carnaval de los Indianos...



On behalf of ING, welcome to La Palma







22 countries represented

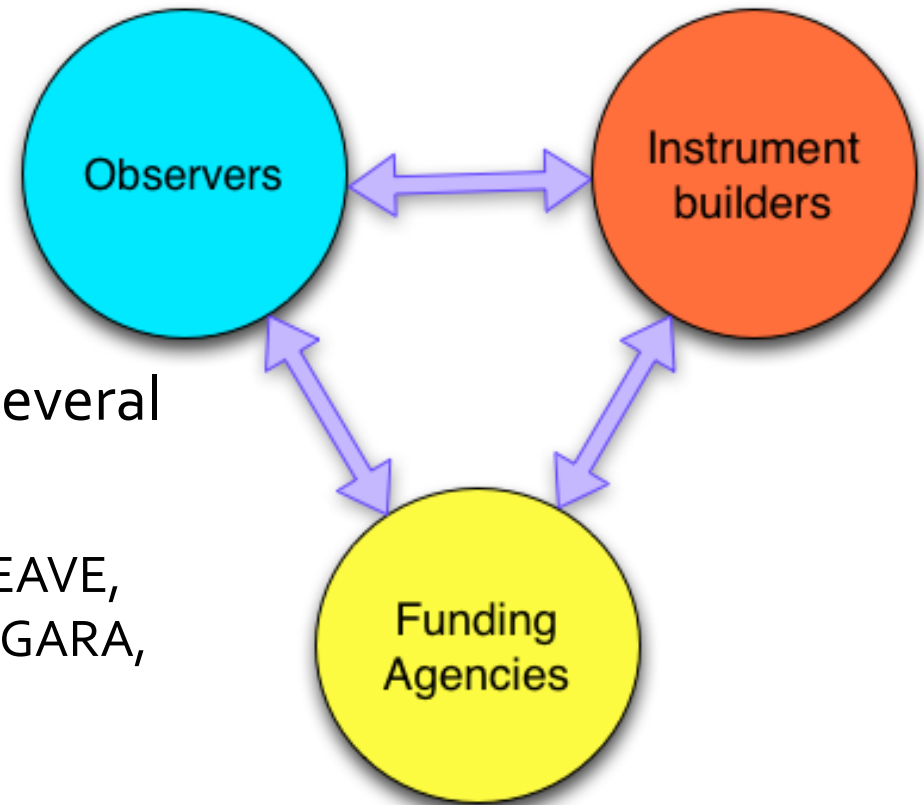
| Country | # | Country | # | Country | # |
|--------------|------------|-----------|---|-------------|---|
| TOTAL | 148 | Japan | 5 | Estonia | 2 |
| Spain | 57 | China | 4 | Iran | 1 |
| UK | 21 | Chile | 3 | Poland | 1 |
| USA | 16 | France | 3 | South Korea | 1 |
| Netherlands | 7 | Mexico | 3 | Sweden | 1 |
| Germany | 7 | Lithuania | 2 | Turkey | 1 |
| Australia | 6 | Slovenia | 2 | | |
| Italy | 5 | Canada | 1 | | |

Spectroscopy and imaging...

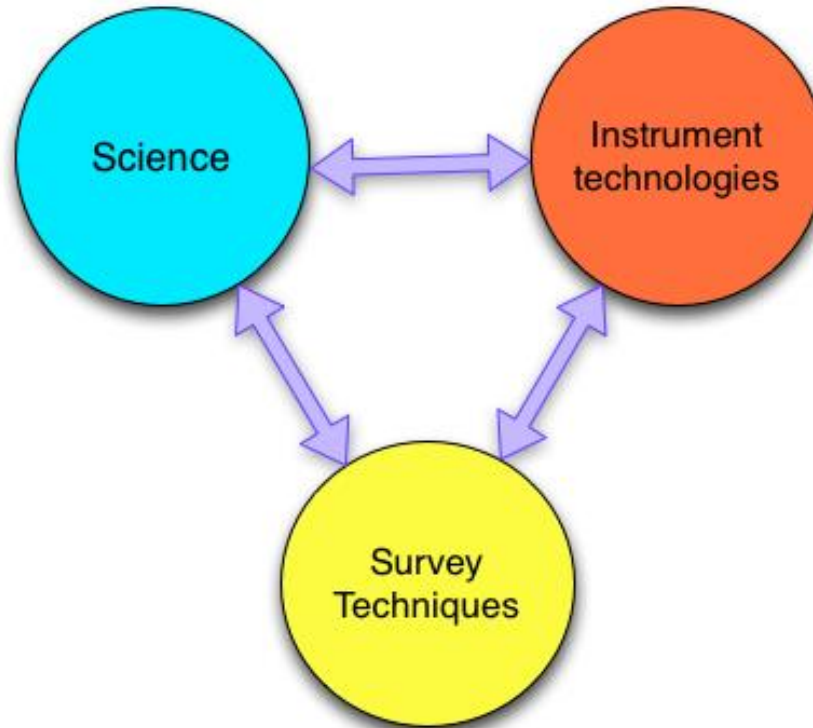
- Nineties:
 - Need targets for 10m telescopes!@!
 - Generation of WF imaging cameras
 - Success, maturing photometric science
- Last decade
 - Need WF spectrographs to exploit imaging surveys!@!

Progress requires 3 agents

- Successful interplay
- WF MOS efforts cristalising in several projects
 - FMOS, VIRUS, LAMOST, WEAVE, MOONS, 4MOST, DESI, MEGARA, MIRADAS



What brings us here this week



- Ensure the actors of three areas talk to each other
- Get the best plans for upcoming surveys



Three main science areas



| 1. MW, stars | 2. Galaxy Evolution | 3. Cosmology |
|-------------------------------------|---|---|
| MW archaeology | Mid-z evolution | BAO's |
| Stellar physics | Results from SDSS to VIMOS, DEIMOS, VIRUS | z-space distortions |
| Gaia | | Redshifts! |
| Gaia-ESO, GALAH | Galaxy clusters | Herschel-Planck |
| Apogee | Low-z: 3D spectroscopy of nearby disks | |
| Future: MOONS, WEAVE, 4MOST, LAMOST | Future: z surveys for LOFAR, 'extend SDSS to z 0.6' | Future: DES, SDSS4, DESI, PAU, Euclid, DESpec |
| | Pencil beams on 10m: | |
| | KMOS, MOSFIRE, EMIR, VIMOS, DEIMOS, OSIRIS, MEGARA | |



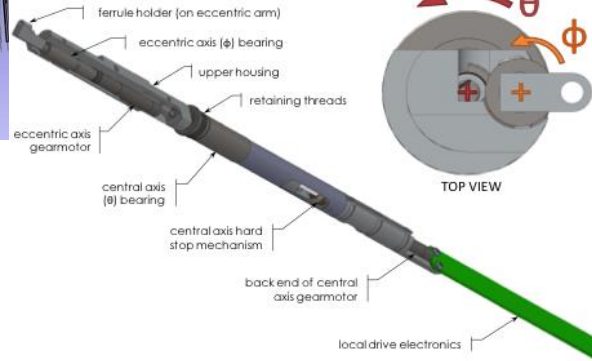
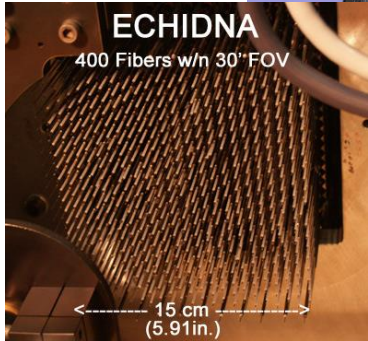
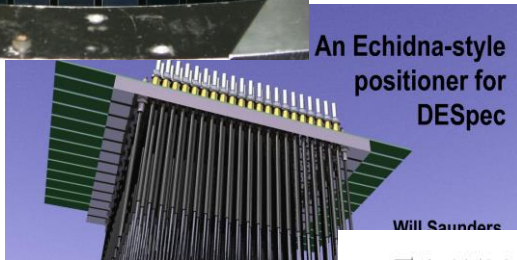
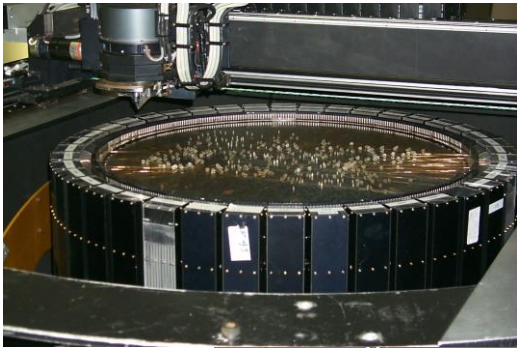
For each of the three topics...

- Results from past projects, lessons
- Current projects
- Technologies for tomorrow



Technologies...

Fibre positioners



WF correctors

Spectrograph; detectors

Survey technologies

- Combining several surveys
- Quality control
- Data handling, data processing

MOS capabilities at La Palma....

- GTC
 - OSIRIS, EMIR, MEGARA, MIRADAS
- WHT
 - AF₂, LIRIS, WEAVE
- TNG
 - DOLORES



Social activities

- Tonight 20:00 Carlos Frenk
Nuestro improbable universo
- Tuesday walk tour this part of town
 - Renaissance Architecture
 - Flemish art
- Wednesday walk in Los Tilos natural reserve
- Thursday conference dinner
- Friday visit Observatory (WHT, GTC)

Looking forward to plenty opportunities to talk

Enjoy!

