GO•IRS:
GTC Optical Intermediate-Resolution Spectrograph

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and the GO-IRS Team

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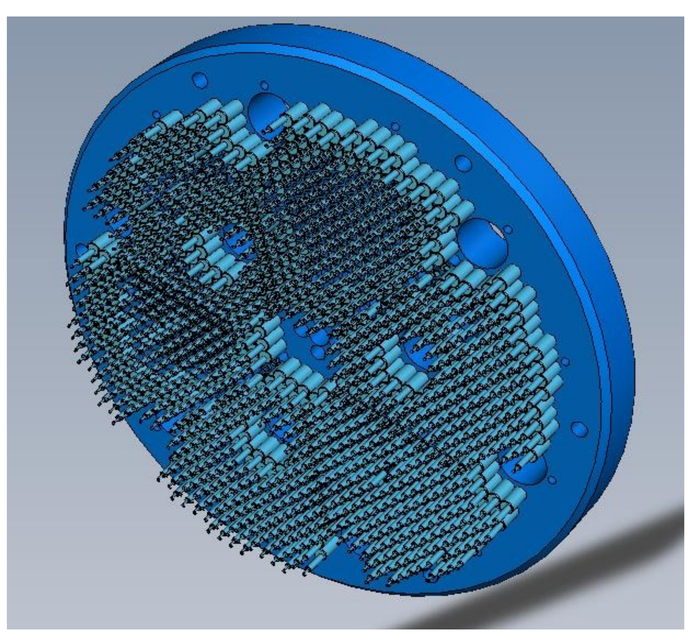
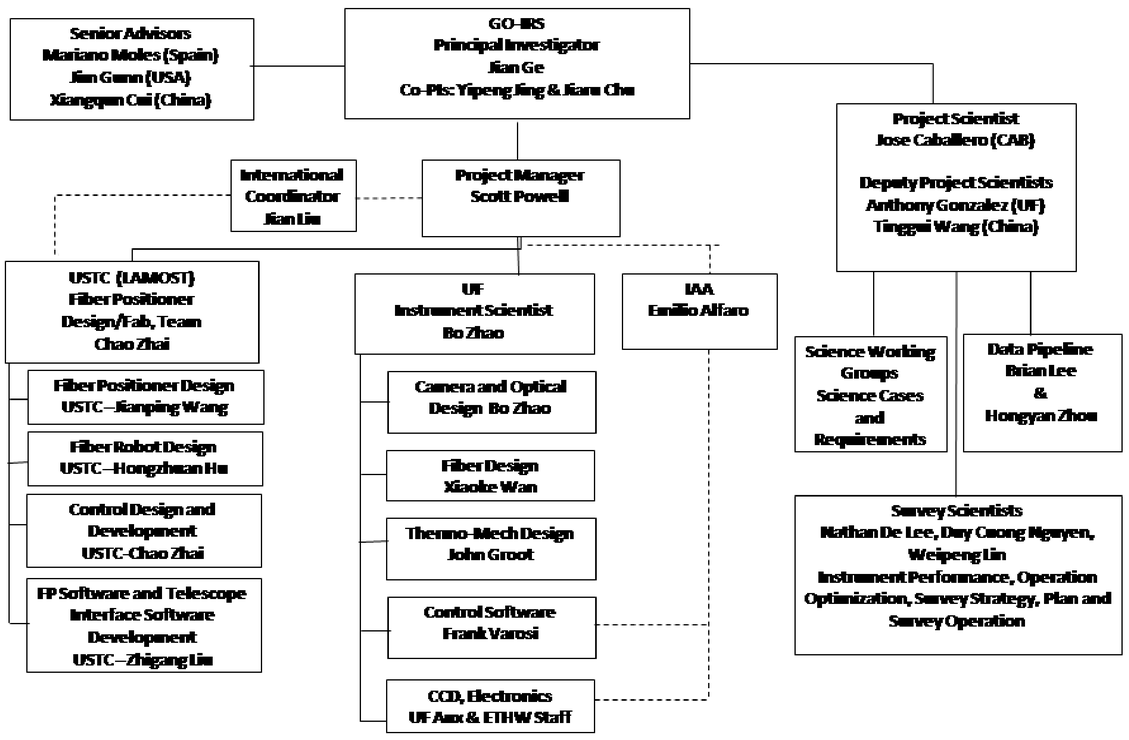
Abstract. GO-IRS stands for "**G**TC **O**ptical **I**ntermediate Resolution **S**pectrograph". It is the answer of a big team of over 100 experienced researchers and engineers in the United States, China and Spain to the recent call for new instrumentation for the 10.4 m Gran Telescopio Canarias. The GO-IRS main facts are: 1000 MOS fibres in a 15 arcmin circular field of view; 4x400 IFU fibres in the central 2 arcmin; two channels: blue ($\Delta\lambda$ = 0.37-0.60 μm) and red ($\Delta\lambda$ = 0.60-1.00 μm); R=20k, 10k, 5k (red), 2k (blue) and intermediate spectral resolutions; use of telescope-proof technology (e.g. LAMOST, MARVELS). The GO-IRS Science Team is developing three design reference cases on near-field cosmology in the Milky Way, kinematics and abundances in galaxies of the Local Group and of the local Universe, and astrophysical properties and clustering of distant galaxies at z=1-4. We open our GO-IRS Science Team to all Spanish astronomers interested in working with us.

Tele-scope	Instrument	MOS FoV (arcmin)	$\Delta\lambda$ (μm)	MOS R_{max} ($\lambda/\Delta\lambda$)	N of MOS fibres	N of IFU fibres	Status
GTC	**GO-IRS**	**15.1**	**0.37-1.00**	**20,000**	**1,000 (500)**	**1,600 (800)**	**Proposed**
Keck	Deimos	16.7 x 15.0	0.41-1.10	5,000	<130 (mask)	0	On sky
VLT	FLAMES (GIRAFFE)	25	0.37-0.95	24,000	130	300 +300	On sky
VLT	VIMOS	14 x 16	0.36-1.00	2,500	<650 (mask)	6,400	On sky
HET	VIRUS	20	0.36-1.00	850	132	32,600	Being built





Concept. If selected as a GTC third-generation facility, GO-IRS would be the only instrument at an 8-10 m-class telescope providing simultaneously a resolution R=20k and up to 1,000 MOS fibres, apart from an IFU capability in the centre of the field of view (see top left table). We take advantage of telescope-proof technology, such as fibre positioning (see above our focal plane plate design) and data pipeline (LAMOST), opto-mechanics and control (MARVELS) and atmospheric dispersion corrector (Keck). See also our comprehensive organigram to the left.

SWG	DRC	Acronym	MOS R ($\lambda/\Delta\lambda$)	N of targets	N of nights
MW	DRC1	2E5	20,000 (MOS)	200,000 stars	30
LU	DRC2a	Local Group	10,000 (MOS +IFU)	10,000 stars	20
“	DRC2b	z=0	5,000-10,000 (IFU+MOS)	75 galaxies	56
DU	DRC3	3GDS	2,000-5,000 (MOS)	35,000 +215,000 galaxies	30+60

Science Design Reference Cases. With GO-IRS, we would have the possibility to investigate virtually all objects in the Universe: from exoplanets to distant quasars. We have designed three reference cases (Milky Way MW, Local Universe LU and Distant Universe DU, see bottom left table) and several secondary science cases, and looked for synergies with other projects and space missions (e.g. *GAIA*, LSST, J-PAS, PanSTARRS-1, GTM, *JWST*...)

GO-IRS Science Team. We are over 80 scientists in more than 30 institutions (25% USA, 50% China, 25% Spain). The most important contributing institutions are listed at the top of the poster. The full (current) list of Science Team members goes below (red: Spain, green: China, blue: USA; boldface: University of Florida):

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