The **S**uper**N**ova **I**ntegral **F**ield **S**pectrograph

SNIFS is a two-channel optical spectrograph equipped with a microlense-array integral field unit. The blue channel will cover 3500—5700Å at a fixed dispersion of ~ 2.2Å/pixel, while the red channel will cover 5300–10500Å at a fixed dispersion of ~ 3.0Å/pixel. The nominal resolution is set by the pixel sampling, and is therefore $\delta\lambda/\lambda \sim 1200$. The two channels can be operated together or separately, and are split using a dichroic beam-splitter with a nominal half-power point at 5500Å. The target system throughput is 30% or better over 50% of the spectral range, and no worse than 10% anywhere over the full spectral range. The integral field unit consists of a 15×15 array of fused silica microlenses, and will sample a 6" $\times$ 6" region around the target at a resolution of 0.4" per lenselet. The optics are all transmission elements, including the dispersive element which is a total internal reflection prism mated to a grism. The detectors will be LBNL/UCB high-resistivity fully-depleted CCD's, of size 2048×4096, with high-performance AR coatings. A conceptual drawing of *SNIFS* is presented in Figure 1.

SNIFS includes a photometry camera run in parallel with the spectrograph. This photometry camera is designed to allow photometric normalization of the spectroscopic observations so that spectrophotometric observations can be obtained even under non-photometric sky conditions. The photometry camera and spectrograph will utilize the same shutter so that observations with both instruments are guaranteed to have identical observing conditions. The photometry camera will have one or more filters, probably fixed (TBD). Again, it is likely that an LBNL/UCB 2048×4096 CCD will be used.

SNIFS contains its own guider camera. Most likely a LBNL/UCB 2048×4096 CCD will be used as the detector, although a commercial guider camera may be considered. The guider obtains a panoramic image from which a suitable guide star is selected. Subsequently, a sub-region of the guider CCD centered on the guide star is read at a rate of several Hz and analyzed to provide a signal to the telescope guider motors. A portion of the guide camera is covered with a cylindrical lense or wedge to provide a signal for control of the telescope focus.

SNIFS is also equipped with a calibration unit for the spectrograph which will provide for spectral flats and arc exposures. Flat-field correction for the photometry camera will rely on dome flats and sky flats. Twilight flats will be useful for both the spectrograph and the photometry camera, and will be obtained when possible.

The intended operational mode for *SNIFS* is quasi queue observing. Target coordinates and exposure sequences are generated automatically, but a night assistant is required to move the telescope to the required coordinates during an appropriate time window. It is anticipated that with the telescope close to the correct nominal coordinates, the photometry camera will provide images from which a coordinate offset can be computed quickly, and sent to the telescope and the guider to execute. This step may not be needed if the telescope pointing is sufficiently accurate that the target is always well-place within the field of the *SNIFS* IFU. Depending on the level of automation of the telescope focus, a night assistant may also have to adjust the focus to a value given by the *SNIFS* guider. An assistant is needed to refill the four dewars with LN2 twice daily.

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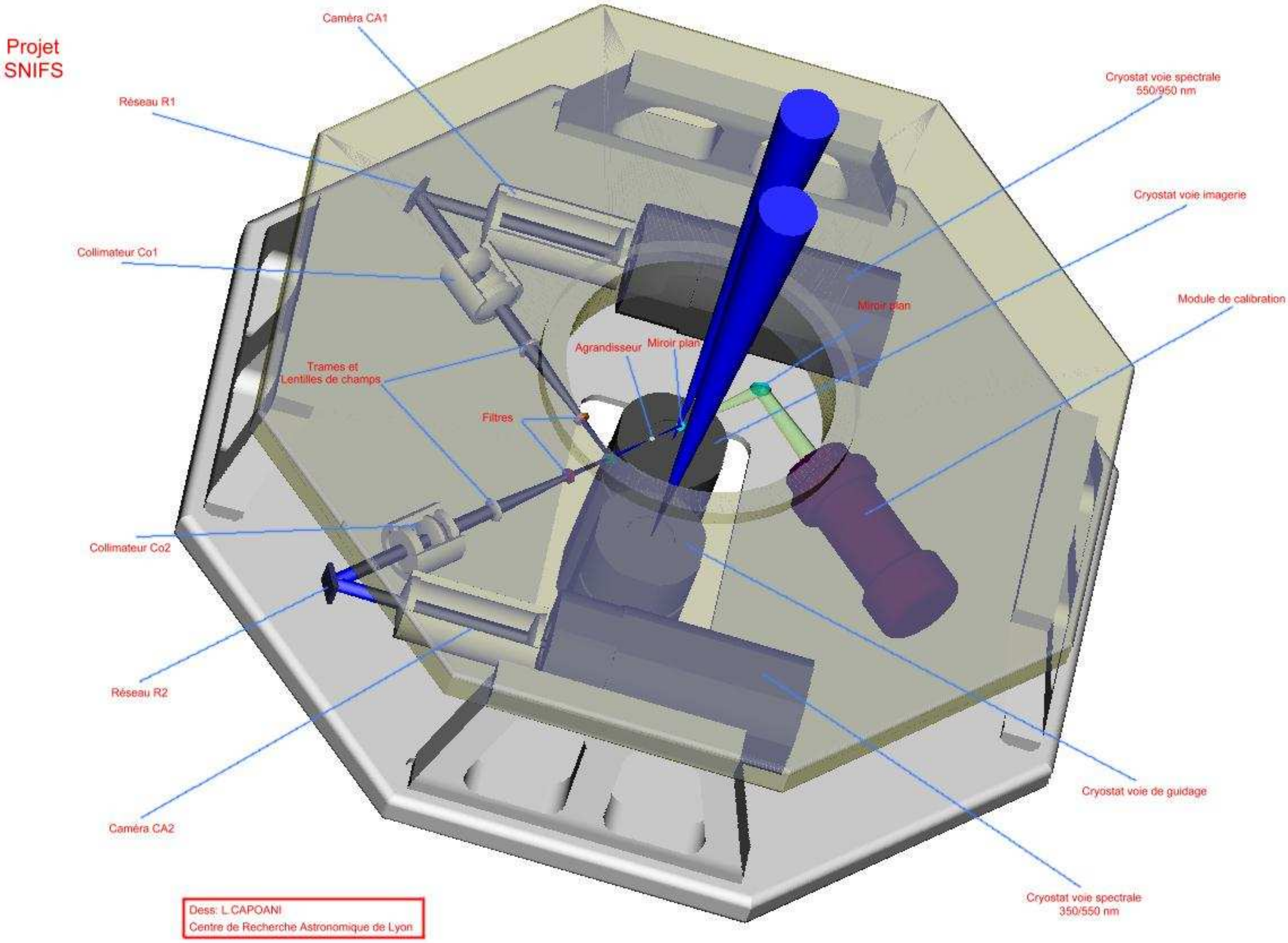

Figure 1: Mock-up of *SNIFS* spectrograph for UH 88-inch telescope. The on-axis f/10 beam from the telescope impinges on a total internal reflection pick-off prism which directs light into the two-channel spectrograph. The light is then split by a dichroic, sent through custom collimators, grism, camera, and CCD's for each of the two channels. Light not intercepted by the pick-off prism illuminates the photometry camera. The photometry camera and the spectrograph share a shutter. An off-axis beam illuminates the guider camera at all times, allowing fast guiding during spectroscopy, and focusing or offsetting between exposures (i.e. during readout of the spectrograph and photometry detectors).