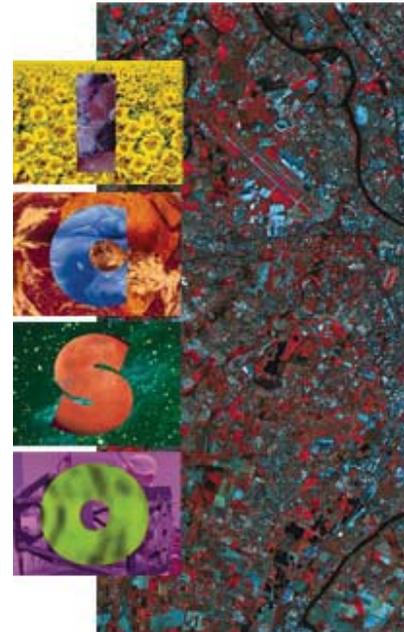


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## *Planar integrated optics, a new solution in optical instrumentation*

*P. Haguenuer*



## PLANAR INTEGRATED OPTICS, A NEW SOLUTION IN OPTICAL INSTRUMENTATION

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Planar integrated optics present an attractive solution for future instrumentation, both in ground and space based applications. The technologies used in the manufacturing of such components, supported by research laboratories as well as industries, are mature enough to provide complex devices.

Starting from existing components developed in the field of telecommunications, all our work have led to the validation of both integrated optics functions and linked technological solutions to operate them. Our researches and developments are conducted in several fields at the same time in the scope of defining complete instrumental solutions using planar integrated optics as the central part. Existing components as well as new ones have been studied in the case of astronomical interferometry in the near infrared H band (1.43 - 1.77 microns). Components allowing the combination of 2, 3 and 4 telescope beams have been designed to fulfil the astronomical requirements and fully validated. Based on technological capabilities knowledge derived from these devices tests, existing functions have been optimised and new ones have been developed. The extension of planar integrated optics waveguides to higher wavelengths (2 - 10 microns) are under study. Using the integrated optics technology, the concept of a fully integrated camera has been developed and characterised. The IONIC prototype includes in a single dewar the integrated optics combiner, the detector and all the optical interfaces. Integrated optics also allows the manufacturing of different types of sensors, for relative and absolute metrology for example. In parallel to interferometric combination, other instrumental functions can thus be achieved, leading to a compact solution.

The aim of this presentation is thus to present the results obtained through our integrated optics developments. Based on demonstrated technological properties, and combined with a survey of new optical capabilities (dichroic separation, optical path modulation, polarization modification, ...), the design of complex instrumentation using this emerging technology can be thus envisioned in the near future for scientific space missions. As integrated optics devices are easy to operate, they also present interesting solutions for space technological demonstrators (SMART-like missions).