

# An automatically controlled SCIDAR instrument for Roque de los Muchachos Observatory

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## ABSTRACT

SCIDAR has proved to be the most efficient technique to obtain the optical vertical structure of the atmospheric turbulence measured from ground level. However, the common procedure of obtaining the data, as well as its 'a posteriori' treatment, requires a huge number of highly qualified human resources. A systematic monitoring programme becomes really onerous. Consequently, the development of a full automatically controlled SCIDAR device seems to be evidently justified. We have recently developed a SCIDAR instrument providing high performances in automatic control and data reduction, presently in test phase. It has been designed for the Jacobus Kaptein Telescope at the Roque de los Muchachos Observatory, with the goal of monitoring the vertical turbulence with a high temporal coverage. This device is not only restricted to the JKT but can also be used for other telescopes.

**Keywords:** Vertical Turbulence Profiles, Site Characterization, Instrumentation.

## 1. INTRODUCTION

A systematic register of the vertical profiles of turbulence and wind, measured from ground level, requires a huge number of highly qualified human resources. However, although an experimental knowledge of the spatial and temporal vertical structure of the turbulence is crucial for optimizing the efficiency of adaptive optics systems, not enough effort has been devoted to getting continuous and systematic data. We have started a long campaign of observations to characterize the vertical structure of the turbulence in the Roque de los Muchachos and Teide Observatories using generalized-SCIDAR technique. The classical SCIDAR (SCIrrillation Detection And Ranging) technique was proposed by Vernin & Roddier (1973) and developed during years (Rocca, A., Roddier, F. & Vernin, J., 1974), but this one did not allow the measurement of the turbulence in the low atmospheric layers, above the telescope dome. In order to overcome this disadvantage, Fuchs, Tallon, & Vernin (1994 and 1998) proposed the generalized-SCIDAR version, which has been verified and exploited in the last years (Ávila, Vernin & Masciadri 1997; Ávila, Cuevas & Vernin 1998; Kluckers et al. 1998). We present here a new instrument which is currently undergoing test.

The systematic campaign of measurements of turbulence profiles in the observatories of the Canary Islands began in November 2002 and it will continue for several years. The average frequency of observation is equivalent to 4 nights every 2 weeks. Whereas the easy-use instrument is operative, the campaign has been begun using a prototype. Basically, it follows the same design that the original one used by the Vernin's group of Laboratoire Universitaire d'Astrophysique de Nice (LUAN) which has been described in diverse publications (e.g. Fuchs, Tallon, & Vernin 1994 and 1998).

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