DESIGN AND DEVELOPMENT OF A RAMAN LIDAR FOR CHERENKOV GAMMA ARRAY EXPERIMENTS

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Future Cherenkov Gamma Ray (CGR) experiments will reach a sensitivity and energy resolution never obtained until now by any other high energy gamma–ray experiment. It is well known that atmospheric conditions contribute particularly in this aspect. Raman lidars can help reduce the systematic uncertainties of the molecular and aerosol components of the atmosphere so these performances can be reached. The motivation for Raman lidars and the design and development of the LUPM Montpellier Raman lidar system is described. It provides both multiple elastic and Raman readout channels and custom-made optics design. A genuine laser trigger-based photomultiplier gating system has been incorporated to minimize excessive light pollution at very low altitudes. Using a 1.8m receiver it is capable of acquiring complete Raman profiles in less than 120 sec, a prerogative for use in Cherenkov experiments. Preliminary lidar tests and signals collected at the Observatoire de Haute de Province (OHP-France) demonstrate the actual performance of the lidar in consistency with the desired goals.