

Compact Wide-Field Astronomical Telescopes for Dome C

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Abstract. We describe our project for a small and compact telescope, based on the TRT design, for wide-field observations from Dome C on the Antarctic Plateau, and discuss the main scientific goals.

The project is based on the 2-mirror, 3-reflection (TRT) Amoretti's design (Amoretti et al. 1989), where the primary acts both as the first and third reflecting surface. The main benefits of the TRT design are: the large corrected and unvignetted FOV, the flat focal plane allowing easy placing of large area detectors, easy baffling of straylight, minimum encumbrance (width/length close to unity), and easy instrument handling. Two 30 cm f/3 prototypes were realized in 1994 and 2002, and tested. In 2003 a new 45 cm f/5 TRT was realized based on Lemaitre's active optics techniques (Lemaitre 1996): the primary was obtained from a double-vase form substrate, polished spherically at rest, then in situ stressed by applying back to the mirror at 0.8 atm depressure. The secondary with a tulip form was polished under stress. The telescope was mounted in Tor Vergata, and tests are underway.

Our goal is to place on Dome C a mid-size TRT equipped with large area V-NIR detectors. The primary scientific objective, in the framework of the Spaceguard Foundation, is the search for potentially hazardous NEAs, especially at small solar elongations. The telescope can also be used for the search of extra-solar Jupiter-like planet transits, astroseismology and identification of GRBs.

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References

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