First time comet observations from National Observatory of Turkey

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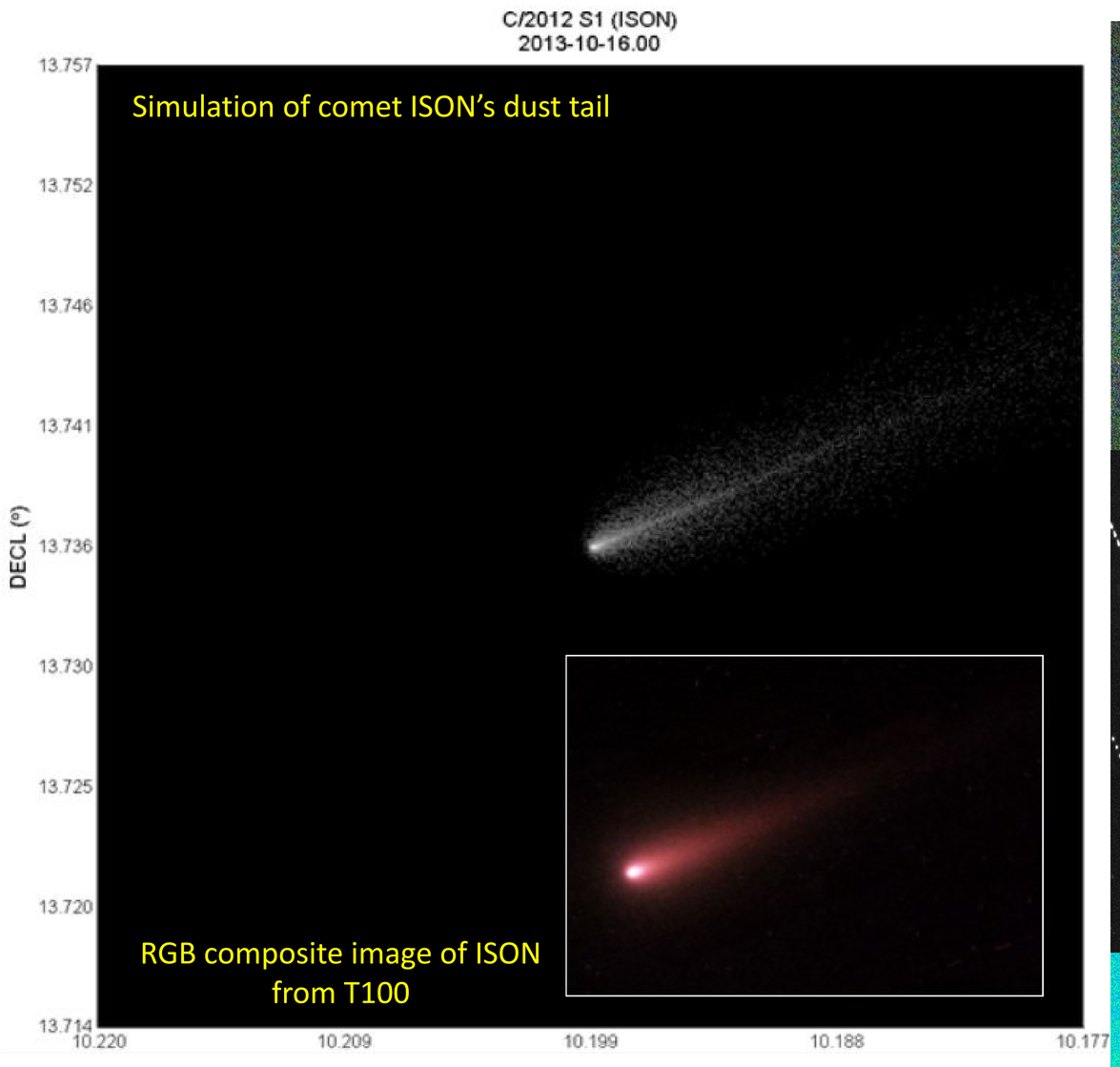
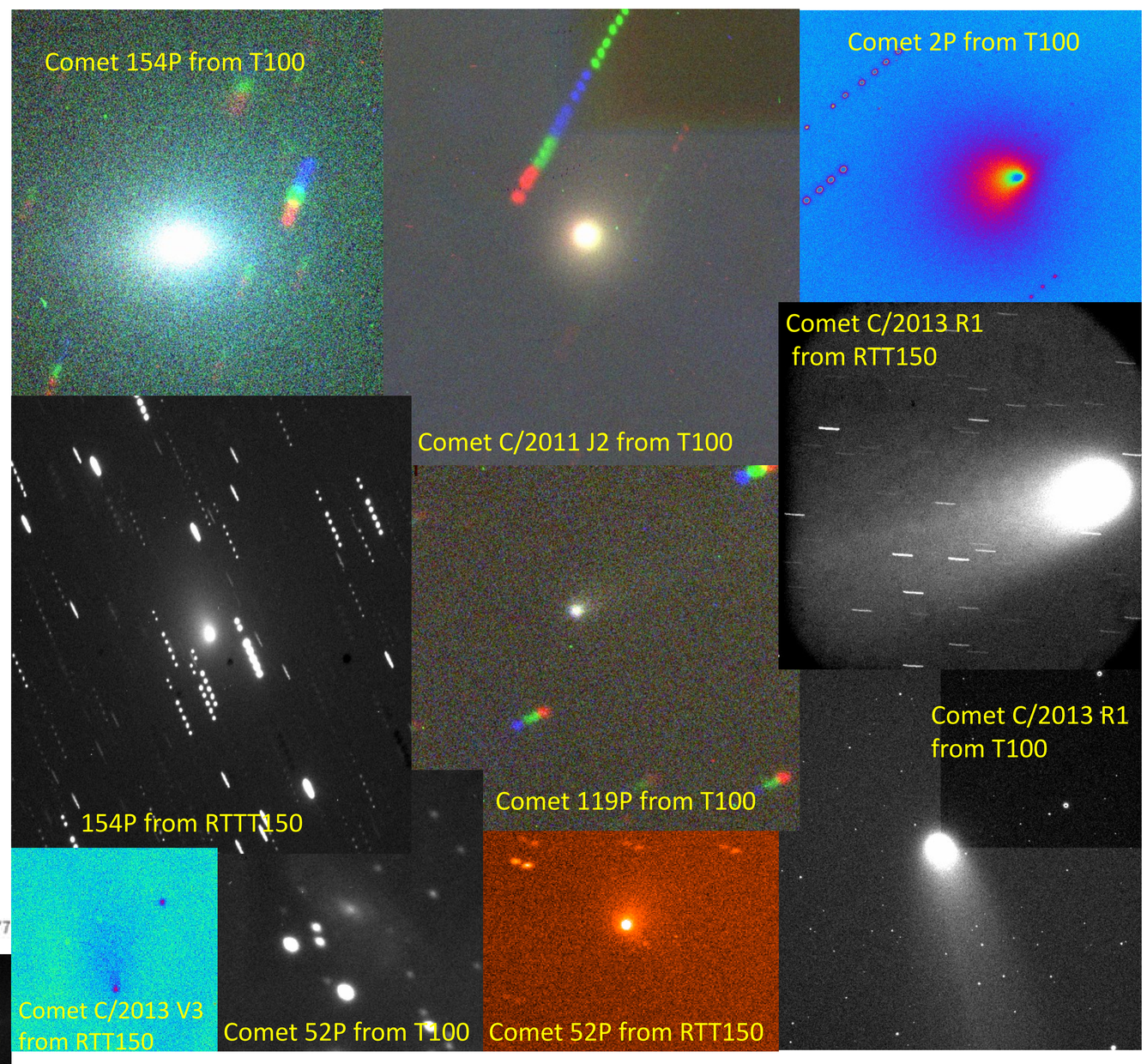
We performed **first time scientific comet observations** from Tübitak National Observatory (TUG), Turkey, and tested the capabilities of the instrumentation for future cometary studies. Our observations were mainly driven by the scientific questions regarding comet C/2012 S1 (ISON) around its perihelion passage, but we also had the opportunity to observe the other objects presented below. All comets were monitored for several nights with the Bessel R, V, B filters from the 1 m (T100) and 1.5 m (RTT150) telescopes. Additionally, we acquired the **first spectroscopic observations of a comet** from TUG, using TUG Faint Object Spectrograph (TFOSC with grism between 3230-9120 Å) mounted on RTT150. Using these observations, we could assess the quality of TUG instruments for cometary science, and identified a few limitations. We propose several technical improvements for future comet observations. This study is going to open new observational opportunities to Turkish astronomers and allow participations to international campaigns on cometary science.





Observations and Simulations: Since the observatory is not equipped with the comet gas filters, we intended to follow the formation and evolution of dust coma structures of comet ISON, and use well tested models to simulate and understand this activity (Vincent et al. 2010, 2013, Lin et al. 2012). Additionally we wanted to acquire spectra and derive the composition of the tail before and after perihelion. Unfortunately, the comet was not very active during our pre-perihelion observations and completely disintegrated at the end of November 2013.

References: Vincent, J.-B., Böhnhardt, H., & Lara, L.-M., 2010, A&A, 512, A60
Vincent, J.-B.; Lara, L. M.; Tozzi, G. P.; Lin, Z.-Y.; Sierks, H., 2012, A&A, 549, A121
Lin, Z.-Y., Lara, L. M., Vincent, J.-B., & Ip, W.-H., 2012, A&A, 537, A101

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Results: TUG facility requires the following improvements for future comet observations: Additional comet gas filters are necessary and are in the selection process.

T100: Imaging of fast moving bright comets (like comet ISON) can be achieved by using short exposure times from remotely operable T100 telescope, but non-sidereal tracking has to be improved for the observation of fast moving small bodies of the solar system. Studies on the improvement of T100's tracking have already started at TUG.

RTT150: Non-sidereal tracking is excellent and allowed us to take spectra of comet 154P. Comet observations can successfully be performed using this instrument both with imaging and spectroscopy.

We have established collaboration with the Rosetta mission to monitor comet 67P/Churyumov-Gerasimenko starting from spring 2015. We are also involved with follow-up GAIA observations of solar system objects with RTT150 (max. 5 nights/yr), T100 (max. 80h/yr) and T60 (10-15% of the total observing time).

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