

Accurate Optical Time Transfer between a Clock on Ground and in Space

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The optical time transfer between a H-maser on the ground and the atomic clock ensemble in space (ACES) via the ELT interface, requires two concatenated highly stable two way laser links. While the use of satellite laser ranging provides both the range information and the reading (epoch) of the remote clock by a free space laser link relative to the geometrical reference points on the ground and the satellites, another actively stabilized fiber based ground link provides the accurate time reference between the H-maser on the ground and the ranging system. We have equipped the local reference target at the ranging site also with similar two-way compensated time and frequency reference. Now it is possible to identify and remove systematic errors to within 1 ps caused by otherwise not detectable system delays. We report on a lossless time and frequency distribution system that delivers this functionality and show first results of the system capability to identify systematic errors locally.