

SPECIAL COLLOQUIUM**NRAO/Socorro Colloquium Series****Jeroen Koelemeij***U Amsterdam*

Simultaneous fiber-optic time and data transfer for VLBI

Astronomical observations with distributed antenna arrays (such as VLBI) require tightly synchronized time and frequency references at each antenna element. Typical synchronization solutions make use of stand-alone atomic clocks such as hydrogen masers, in some cases augmented by GPS timing receivers. In recent years, several research groups have developed and demonstrated fiber-optic methods for time and frequency distribution over long distances. The unsurpassed accuracy and stability afforded by these methods opens up the perspective of a future fiber-optic infrastructure, providing high-capacity telecommunication along with atomic clock signals of very high quality as needed for VLBI. A promising approach into this direction is the White Rabbit (WR) protocol developed at CERN, which combines Gigabit Ethernet with time transfer offering 1 nanosecond timing uncertainty over distances up to 10 km. In this colloquium, I will present results obtained with a fiber-optic WR link between the cities of Amsterdam and Delft in the Netherlands, aimed at sub-nanosecond time transfer over 2×137 km of installed optical fiber including optical amplifiers. I will furthermore discuss ongoing efforts to implement WR for (e)VLBI observations in existing dense-wavelength-division-multiplexed networks, within the framework of the European ASTERICS project*.

*This project received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 653477.

December 10, 2015**11:00 am****Array Operations Center Auditorium****All NRAO employees are invited to attend via video, available in Charlottesville Auditorium, Green Bank Auditorium, and VLA Video Conference Room.**
