Contribution ID: **94** Type: **Poster**

Agile frequency synthesis with distributed synchronization

In the current Virgo setup, quantum noise reduction is achieved by injecting squeezed vacuum states in the interferometer dark port. For their generation and phase stabilization with respect to the interferometer carrier, low-noise phase locked loops (PLL) and direct digital synthesizers (DDS) are used. An RF-mixer based architecture is under investigation for the development of an alternative frequency synthesizer with improved close-in phase noise, which may also be suitable for Einstein Telescope. Such a circuit essentially combines the best of PLL and DDS technologies, allowing phase alignment of the generated signal in relation to a given reference clock, together with strong "jitter-cleaning"capabilities and agile frequency adjustment. The deployment of a White-Rabbit based distributed synchronization system will make it possible to address synchronization of RF sources across the detector with adequate frequency stability.
The talk is intended to showcase the principle of operation of the circuit, expose the main design challenges and report some preliminary measurements on a demonstrator setup. Limitations of the current approach will then be exposed, concluding with some remarks on further developments.

Primary authors: TOFFANO, Marco (INFN Padova); BELLATO, Marco (INFN Padova); ZENDRI, Jean Pierre (INFN Padova); BERGNOLI, Antonio (INFN Padova); GRIGGIO, Alessandro (INFN Padova)

Presenter: TOFFANO, Marco (INFN Padova)

Session Classification: Poster Session

Track Classification: Instrument Science (ISB): Active Noise Mitigation