Contribution ID: **137** Type: **Contributed talk**

The Fast Radio Burst sky revealed by two Dutch telescopes.

Monday, 15 May 2023 12:55 (15 minutes)

Fast radio bursts (FRBs) are so crazily bright that they must be powered by uniquely energetic emission mechanisms. Identifying their physical nature requires good localisation of more detections, and broadband studies enabled by real-time telescope combinations. I will present the results from the Apertif FRB survey (ALERT) that ran 2019-2022. ALERT performed wide-field, fully coherent, real-time FRB detection and localisation on the Westerbork interferometer. We detected a new FRB every week of observing, interferometrically localised to ~0.4-10 sq.arcmin, leading to confident host associations.

The 24 discovered FRBs are broad band and very narrow, of order 1ms duration. Only through our very high time and frequency resolution are these hard-to-find FRBs detected, producing an unbiased view of the intrinsic population. Apertif can localise one-off FRBs with an accuracy that maps magneto-ionic material along well-defined lines of sight. Our combination of detection rate and localisation accuracy exemplifies a new phase in which a growing number of bursts can be used to probe our Universe.

We also cojoined two of the most sensitive telescopes in the world, that are both in the Netherlands: Apertif and LOFAR. Using simultaneous radio data spanning over a factor 10 in wavelength, we detected FRB emission below 300 MHz for the first time. We thus show that the chromatic behavior of periodically repeating FRB 20180916B strongly disfavors scenarios in which absorption from strong stellar winds causes FRB periodicity. We establish some FRBs live in clean environments – a prerequisite for certain FRB applications to cosmology.

Primary author: VAN LEEUWEN, Joeri (ASTRON)

Presenter: VAN LEEUWEN, Joeri (ASTRON)

Session Classification: Plenary Session

Track Classification: Time Domain