

PHAROS Conference 2019: the multi-messenger physics and astrophysics of neutron stars



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Apertif transient detections of single and merging double neutron stars

Apertif is a highly innovative receiver system that is currently starting operations on the Westerbork Synthesis Radio Telescope. Its factor 40 increase in field-of-view allows astronomers to survey the sky at 1.4 GHz with an unprecedented combination of sensitivity and speed. At high time resolution this enables deep searches for millisecond transients over the entire Northern hemisphere. In the image domain, even the large error boxes accompanying triggered, multi-messenger events can be quickly searched.

I will report on ALERT, the Apertif Lofar Exploration of the Radio Transient Sky, our pulsar and FRB survey that started Jan 2019. ALERT is a highly sensitive, real-time search, that is unique in providing excellent interferometric localisation, essential for discovering the hosts and nature of the enigmatic one-off FRBs.

I next describe ARGO, the Apertif Radio - Gravitational wave Observatory, our program to discover and interpret the electromagnetic bursts that accompany gravitational-wave events. We focus on mergers involving neutron stars, as these produce relativistic mass ejections and strong radio emission – possible even delayed, prompt FRB-like bursts when an intermediate-stage supermassive neutron star collapses.

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