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Title : RADAR and radio detection of the PeV-EeV cosmic neutrino flux

With the detection of the high-energy cosmic neutrino flux in the TeV-PeV energy range, IceCube has opened **a new window to our universe, neutrino astronomy**. At even higher energies (> PeV),
the particle flux becomes very small and effective volumes even larger than the cubic kilometer currently instrumented by IceCube have to be covered.Due to its large attenuation length and cost-effective detectors, the radio signal is the perfect messenger to probe such large volumes.

Within the VUB-IIHE astroparticle physics group there is a strong focus on the radio detection technique to probe cosmic neutrinos at the highest energies. The **ERC-StG RadNu/RET project** aims to probe the PeV-EeV cosmic neutrino flux by means of the radar technique to detect the cascade induced when an energetic neutrino interacts in, for example, the Antarctic ice. The **first ever radar detection of a high-energy particle cascade** at the Stanford Linear Accelerator Center (SLAC) lead to the formation of the **Radar Echo Telescope** (RET) collaboration lead by VUB-IIHE and The Ohio State University.

The RET collaboration aims to detect cosmic rays (CR) as well as neutrinos (N) by constructing RET-CR/N telescopes in the near future. The RET-CR telescope will provide the proof of principle of the radar echo method in nature by detecting externally triggered air shower cores penetrating the Antarctic ice. Its successor RET-N will be **the first radar neutrino telescope, with the sensitivity to detect cosmic neutrinos within the first year of operation**. Deployment of the RET-CR detector on the Antarctic ice sheet is foreseen in the near future, aiming for the 2021 Antarctic summer and, if shown successful, will be closely followed by RET-N. The VUB-IIHE has strong involvement on both technical aspects of the detector design and deployment, as well as simulation and reconstruction studies of the radar scattered signal.

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