Dissertation Prize 2017

This year, the GNN dissertation prize is awarded for the 3rd time. Eight theses have been submitted and three winners selected, according to three criteria: 1) scientific quality (which was weighted highest), 2) form and didactic level and 3) introduction and description of the general context.

Stefan Coenders (Technical University Munich) defended his thesis *High-energy cosmic ray accelerators: probing seven years of IceCube muon data for time-integrated emission of point-like neutrino sources* in October 2016. He probed more than 700.000 neutrino events for clustering, with record limits (40% below previous limits) but – alas! – no significant clusters were found (Astrophys. J., 835 (2017) no. 2, 151 and https://arxiv.org/abs/1609.04981). In a second step of his thesis, Stefan studied blazars (together with theorist Maria Petropoulou), in particular the neutrino signal expectation for Mkn421 (*"Time-dependent neutrino emission from Mrk 421 during flares and predictions for IceCube"*, Astropart.Phys. 80(2016) 115 & https://arxiv.org/abs/1603.06954). A multi-messenger study concludes the thesis, searching for correlations between IceCube neutrino events and cosmic ray events (Auger, TA). An interesting 3.35σ excess is found, associated with hard Fermi-LAT objects of the HBL type. It was published as *"Connecting blazars with ultra- high energy cosmic rays and astrophysical neutrinos",* https://arxiv.org/abs/1611.06022 and MNRAS 468 (2017) vol. 1, 597).

J**annik Hofestädt** (ECAP) defended his thesis *Measuring the neutrino mass hierarchy with the future KM3NeT/ORCA detector* in February 2017 at the University Erlangen-Nürnberg. Jannik has investigated numerous effects of ORCA the optimization of performance and obtained important results for the geometry and the trigger. He introduces a new cascade reconstruction algorithm, with a record directional resolution at 7 GeV of about 10°. He shows that this is close to the limits imposed by intrinsic fluctuations of the Cherenkov light. His work was essential for the ORCA part of the KM3NeT Letter of Intent (Journal of Physics G: 43 (8), 084001, 2016 and https://arxiv.org/abs/1601.07459).

Ryan Maunu (University of Maryland) defended his thesis *A search for muon neutrinos in coincidence with Gamma-Ray Bursts in the Southern hemisphere sky using the IceCube neutrino observatory* in June 2016. Ryan's extension of current gamma-ray burst searches to southern hemisphere muon neutrinos is the first for the IceCube collaboration. Although this channel has a higher background, it is also contains the highest energy neutrinos (due to Earth absorption at high energies). Perhaps more importantly, Ryan introduced new statistical procedures for reporting his results. He used a per-burst test statistic to account for potential differences in neutrino observation probability across bursts. This is particularly important to allow for bright bursts in light of existing constraints from previous stacked analyses. Finally, he has combined his results with previous analyses to yield the most stringent limits to date on prompt neutrino production in GRBs, see "*Extending the search for muon neutrinos coincident with gamma-ray bursts in IceCube data"*, Astrophys.J. 843 (2017) no.2, 112 and https://arxiv.org/abs/1702.06868.

This year's prize is sponsored by DESY and Nikhef.