IceCube Institutional Memorandum Of Understanding (MOU)

Scope Of Work

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| Niels Bohr Institute – Københavns UniversitetD. Jason KoskinenPh.D Scientists (Faculty Scientist/Post Doc Grads) : 4 (2 2 1) |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Labor Cat. | Names | WBS L3 | Tasks | WBS 2.1 | WBS 2.2 | WBS 2.3 | WBS 2.4 | WBS 2.5 | WBS 2.6 | Grand Total |
|  | Program Coordination | Detector Maintenance & Operations | Computing & Data Management  | Data Processing & Simulation  | Software | Calibration |
| KE | KOSKINEN, D. JASON | 2.1.1 Administration | Pubcom member | 0.10 |  |  |  |  |  | 0.10 |
|  |  | 2.1.4. Education & Outreach  | Speaking engagements (high school classes, open houses) | 0.10 |  |  |  |  |  | 0.10 |
|  | AHLERS, MARKUS | 2.2.3 Online Filter (Pnf) | Neutrino source WG co-convenor |  | 0.25 |  |  |  |  | 0.25 |
|  | **KE Total** |  | **0.20** | **0.25** |  |  |  |  | **0.45** |
| PO | STUTTARD, TOM | 2.4.1 Offline Data Production | OscNext Event Selection |  |  |  | 0.20 |  |  | 0.20 |
|  |  | 2.2.3 Online Filter (Pnf) | Oscillation WG co-convenor |  | 0.25 |  |  |  |  | 0.25 |
|  |  | 2.5.1 Core Software | PISA |  |  |  |  | 0.10 |  | 0.10 |
|  | **NBI PO Total** |  |  |  | **0.25** |  | **0.20** | **0.10** |  | **0.55** |
| GR | BOURBEAU, ETIENNE | 2.1.4 Education & Outreach | Speaking Engagements | 0.05 |  |  |  |  |  | 0.05 |
|  |  | 2.4.1 Offline Data Production | OscNext Event Selection |  |  |  | 0.50 |  |  | 0.50 |
|  |  | 2.2.4 Detector Monitoring | Monitoring shifts |  | 0.05 |  |  |  |  | 0.05 |
|  | **NBI GR Total** | **0.05** | **0.05** |  | **0.50** |  |  | **0.60** |
| NBI Total |  |  | **0.25** | **0.55** |  | **0.70** | **0.10** |  | **1.60** |

Contribution from Master Students

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Labor Cat. | Names | WBS L3 | Tasks | WBS 2.1 | WBS 2.2 | WBS 2.3 | WBS 2.4 | WBS 2.5 | Grand Total |
|  | Program Management | Detector Maintenance & Operations | Computing & Data Management | Triggering & Filtering | Data Quality, Reconstruction & Simulation Tools |
| Master Students | Leif Rasmussen |  | DirectReco |  |  |  |  | 0.50 | 0.50 |
|  | **NBI Master Student Total** |  |  |  |  | **0.50** | **0.50** |

**IceCube Upgrade**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Labor Cat.** | **Names** | **WBS L3** | **Tasks** | **Funds Source** | WBS 1.1 | WBS 1.2 | WBS 1.3 | WBS 1.4 | WBS 1.5 | WBS 1.6 | **Grand Total** |
| Project Office | Gen2 EHWD | Deep Ice Sensor Modules | Comms Power Timing | Calibration and Characterization | M&O Data Systems Integration |
| PO | RAMEEZ, MOHAMED | TBD |  |  |  |  |  |  |  |  |  |
|  | STUTTARD, TOM | TBD | L3 for Upgrade Simulation |  |  |  |  |  |  |  | 0.15 |
|   |  |  |  |  |  |  |  |  |  | **0.15** |
| NBI Total |  |  |  |  |  |  |  |  | **0.15** |

**Faculty:**

D. Jason Koskinen: IceCube-Upgrade and low-energy simulation, tau neutrino appearance, 100% IceCube

Markus Ahlers: cosmic-ray anisotropy analysis, neutrino sources, “neutrino source” WG co-convenor

**Scientists and Post Docs:**

Tom Stuttard and Mohammed Rameez. It should be noted that Mauricio Bustamante is joining as an Associate Member for ONLY the IceCube-Gen2 activity.

**Ph.D. Students:**

Etienne Bourbeau: Maintainer of Vuvuzela noise model, 2MRS correlation w/ IceCube multiplets, SNOLab DOM noise

Thesis/Analysis topics: Extended Tau Neutrino Appearance Measurement in DeepCore

**Diploma/Master Students:**

New students are likely to be involved with the IceCube Upgrade event selection and reconstruction.

**Description of Service work**

NBI is responsible for refining and maintaining the correlated noise simulation. We are continuing development of DirectReco for DeepCore and the ICU.

The NBI IceCube group also organized a local Masterclass for students of regional High School classes.

**Computing Resources**

|  |  |
| --- | --- |
| **CPU Cores**  | **GPU Cards** |
| 0 | 10 |

We have 10 K20 cards with the following setup.

- 2x E5-2650v2 (8 core, @2.6 GHz, 10% faster than E5-2670)

- 64GB memory

- Max 4x Nvidia K10 GPUs, full bandwidth (16x PCIe 3) simultaneously to all GPUs.