**IceCube Institutional Memorandum Of Understanding (MOU)**

**Scope Of Work**

**Universität Dortmund**

**Wolfgang Rhode**

**Ph.D Scientists** (Faculty Scientist/Post Doc Grads): **2** (1 1 5)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 |
| SC | RUHE, TIM | Online Filter (Pnf) | Physics filters |   |  0.20 |  |   |   |  | 0.20 |
|   | **RUHE, TIM Total** |  |  | **0.20** |  |  |  |  | **0.20** |
| GR | DTMD GR | Detector Monitoring | Detector Monitoring |   | 0.03 |   |   |   |  | 0.03 |
|   | WERTHEBACH, JOHANNES | Simulation Software | PROPOSAL-IceProd integration and maintenance/support |   |   |   |   | 0.50 |  | 0.50 |
|  | HOINKA, TOBIAS | Simulation Production | Simulation production site manager at Dortmund |  |  |  | 0.30 |  |  | 0.30 |
|  | SOEDINGREKSO,JAN | Simulation Software | PROPOSAL-IceProdIntegration and optimization |  |  |  |  | 0.50 |  | 0.50 |
|  | MEIER,MAXIMILIAN | Online Filter (Pnf) | Physics Filters |  | 0.20 |  |  |  |  | 0.20 |
|  | HÜNNEFELD,MIRKO | Online Filter | Reconstruction |  | 0.30 |  |  |  |  | 0.30 |
|   | **Ph.D. Students Total** |  |  | **0.53** |  | **0.30** | **1.00** |  | **1.83** |
| **DTMND Total** |  |  |  | **0.73** |  | **0.30** | **1.00** |  | **2.03** |

**Faculty:**

Wolfgang Rhode

**Scientists and Postdocs:**

Tim Ruhe  Filtering WBS 2.4 with 0.2 FTE

Analysis topics: Machine learning and two dimensional unfolding of various signals

**PhD Students (100% IceCube):**

Mirco Hünnefeld 🡪 Online Reconstruction WBS 2.4 with 0.3 FTE

Thesis/Analysis topics: Energy and direction reconstruction with deep neural networks.

 Tobias Hoinka 🡪 Local MC Production WBS 2.3 with 0.3 FTE

Thesis/Analysis topics: Measurement of Pi/K-ratio, maintenance of an atm. neutrino sample.

Johannes Werthebach 🡪 2.5 PROPOSAL integration with 0.5 FTE

Thesis/Analysis topics: Unfolding of HE atm. muon spectrum.

Jan Soedingrekso 🡪 PROPOSAL Optimization and integration WBS 2.4 with 0.5 FTE

Thesis/Analysis Topic: Cross Section Measurements for HE muons

Maximilian Meier 🡪 Filtering WBS 2.4 with 0.2 FTE

Thesis/Analysis Topics: Machine Learning and high quality sample definition for tau neutrino searches.

**General:**

The Dortmund group uses local resources (LiDO, PhiDO, DGRZR) for IceCube Monte Carlo production.

**Computing Resources:**

|  |  |  |
| --- | --- | --- |
|  |  2018 |  2019 |
|  | CPU Cores | GPU Cards | CPU Cores | GPU Cards |
| IceCube | 400 (+900) | (40) | 400 (+900) | (40) |
| PINGU | --- | --- | --- | --- |
| Gen2 | --- | --- | --- | --- |

**Note: The numbers correspond to the number of CPUs/GPUs that should be available for IceCube simulation on average. The total number of CPUs is larger by a factor of 10 but has to be shared with other experiments and departments. The numbers in parenthesis correspond to the number of cores, which is available but cannot yet be used for IceCube due to delays in the account administration, but will be available very soon.**