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

**Scope Of Work**

**Universität Dortmund**

**Wolfgang Rhode**

**Ph.D Scientists** (Faculty Scientist/Post Doc Grads): **2** (1 1 6)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | Hardware |
| 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  Production | Simulation production site manager at Dortmund |  |  |  | 0.50 |  |  | 0.50 |
|  | ALAMEDDINE, JEAN-MARCO | Simulation Software | PROPOSAL -IceProd integration and optimization |  |  |  |  | 0.30 |  | 0.30 |
|  | SOEDINGREKSO,  JAN | Simulation Software | PROPOSAL-IceProd  Integration and optimization |  |  |  |  | 0.50 |  | 0.50 |
|  | HÜNNEFELD,  MIRKO | Online Filter | Reconstruction |  | 0.30 |  |  |  |  | 0.30 |
|  | **Ph.D. Students Total** | |  |  | **0.33** |  | **0.50** | **0.80** |  | **1.83** |
| **DTMND Total** | |  |  |  | **0.53** |  | **0.50** | **0.80** |  | **1.83** |

**Upgrade**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Labor Cat.** | **Names** | **WBS L3** | **Tasks** | 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 | M&O Data Systems |
| SC | RUHE, TIM |  | PMT Testing |  |  | 0.20 |  |  |  | 0.20 |
|  | **RUHE, TIM Total** | |  |  |  | **0.20** |  |  |  | **0.20** |
|  | KARDUM,  LEONORA |  | PMT Testing |  |  | 0.40 |  |  |  | 0.40 |
|  | BAACK,  DOMINIK |  | PMT Testing |  |  | 0.20 |  |  |  | 0.20 |
|  | **Ph.D. Students Total** | |  |  |  | **0.60** |  |  |  | **0.60** |
| **DTMND Total** | |  |  |  |  | **0.80** |  |  |  | **0.80** |

**Faculty:**

Wolfgang Rhode

**Scientists and Postdocs:**

Tim Ruhe  Filtering WBS 2.4 with 0.2 FTE, Upgrade: PMT Testing WBS 1.3 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.

Jean-Marco Alameddine 🡪 2.5 PROPOSAL integration with 0.3 FTE

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

Johannes Werthebach 🡪 Local MC Production WBS 2.3 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

Leonora Kardum 🡪 Upgrade: PMT Testing WBS 1.3 with 0.4 FTE

Thesis/Analysis Topic: Angular Dependence of Atmospheric Neutrino Flux

Dominik Baack 🡪 Upgrade: PMT Testing WBS 1.3 with 0.2 FTE

Analysis/Thesis Topic: CORSIKA Upgrade

**General:**

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

**Computing Resources:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2019 | | 2020 | |
|  | CPU Cores | GPU Cards | CPU Cores | GPU Cards |
| IceCube | 400 | (40) | 800 | 40 |
| PINGU | --- | --- | --- | --- |
| Gen2 | --- | --- | --- | --- |