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

**Scope of Work**

**Universität Bonn**

**Marek Kowalski**

**Ph.D Scientists** (Faculty Scientist/Post Doc Grads): **2** (1 1 4)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 |
| KE | KOWALSKI, MAREK | Simulation | Simulation tools |   |   |   |  |  0.05 | 0.05 |
|   | **KOWALSKI, MAREK Total** |  |  |  |  |  | **0.05** | **0.05** |
| PO | Böser Sebastian | Run Coordination | Run coordinator |   | 0.50 |   |   |   | 0.50 |
|  |  | TFT Coordination | TFT Board member |   |   |   | 0.10 |   | 0.10 |
|   | **Böser Sebastian Total** |  |  | **0.50** |  | **0.10** |  | **0.60** |
| GR | VOGE, MARKUS | Physics Filters | Online L2 Filter |   |  |  | 0.20  |  | 0.20 |
|   |  | Reconstruction/ Analysis tools | Reconstruction/  |  |   |   |  |  0.10 | 0.10 |
|   | **VOGE, MARKUS Total** |  |  |  |  | **0.20** | **0.10** | **0.30** |
|  | HOMEIER ANDREAS | Physics Filters | Alert System for follow-up |   |   |   | 0.20 |   | 0.20 |
|   | **HOMEIER ANDREAS Total** |  |  |  |  | **0.20** |  | **0.20** |
|   | USNER, MARCEL | Reconstruction Tools | Reconstruction/ Analysis tools |  |   |   |  |  0.20 | 0.20 |
|   | **USNER, MARCEL Total** |  |  |  |  |  | **0.20** | **0.20** |
|   | UBONN GR | Detector Monitoring | Detector Monitoring |   | 0.05 |   |   |   | 0.05 |
|   |   | Reconstruction/ Analysis tools | Reconstruction/ Analysis tools |   |   |   |   | 0.20 | 0.20 |
|   | **UBONN GR Total** |  |  | **0.05** |  |  | **0.20** | **0.25** |
| **UBONN Total** |  |  |  | **0.55** |  | **0.50** | **0.55** | **1.60** |

**Faculty:**

Marek Kowalski – involved in supervision and high energy cross-section calculation

**Post Docs:**

Sebastian Böser – Run Coordinator, TFT Board Member

 Analysis topics:

**Ph.D. Students:**

Markus Voge – Online L2 Filter, Spline reconstruction tools

 Thesis/Analysis topics:

Andreas Homeier – Optimization and operation of optical follow-up

 Thesis/Analysis topics:

Marcel Usner – Particle identification software

 Thesis/Analysis topics:

Lukas Schulte – Online Cascade Filter (in 2012), now working on PINGU

 Thesis/Analysis topics:

**Diploma/Master Students:**

***Resource contribution to Computing by the Bonn IceCube Group and the University***

The installment and operation of the computing cluster includes:

1. Hardware for a new IceCube Computer Cluster (start-up funds from the University)
2. High quality Computing Space, cooling, power & network (provided by Physics Institute)
3. System administration (.3 FTE sys-admin)

*1., Hardware for a new IceCube Computer Cluster*

***As part of the start-up package, the University Bonn supports the installment of a computer cluster that is dedicated to IceCube research***. The budget for the hardware is 250.000 Euro and will be funded in equal shares by the University and the DFG, assuming successful evaluation of the proposal to the DFG.

*2 Computing Space, cooling and power & Networking*

***The Physics Institute provides high quality space, cooling and power.*** The IceCube group is provided with space locally in the PI, that is dedicated and well suited for intensive research computing (i.e. high-bandwidth connections & cooling facilities are available). The facility is currently hosting the 800-node cluster of the ATLAS groups. The University carries electricity costs that arise due to operation of the cluster.

*3. System administration*

***The Bonn University provides 17kEuro per year in funding.*** The system administration for the computing cluster will be approximately .3 FTE, financed through IceCube start-up funds obtained from the University (i.e. 17.000 kEuro per year for 3 years). The administration of the cluster will be a joined effort with the ATLAS-HEP groups at the PI (joined effort is 1 FTE). If there is need for further system administration it will be provided from within the IceCube group.