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

**Scope of Work**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 | Van Eijndhoven Nick | Reconstruction Tools | development of reconstruction tools (IcePack framework), |   |   |   |   |  0.25 | 0.25 |
| Data Quality | data quality verification |   |   |   |   | 0.25 | 0.25 |
| **Van Eijndhoven Nick total** |  |  |  |  |  | **0.50** | **0.50** |
| De Clercq Catherine | administration | Institutional Lead | 0.20 |   |   |   |   | 0.20 |
| **De Clercq Catherine total** |  | **0.20** |  |  |  |  | **0.20** |
|     PO | De Vries, Krijn | Reconstruction Tools | muon track reconstruction in IceCube and DeepCore |   |   |   |   | 0.25 | 0.25 |
|   | Data Quality | GRB/AGN analysis |   |   |   |   | 0.25 | 0.25 |
|  | **De Vries, Krijn Total** |  |  |  |  |  | **0.50** | **0.50** |
|  | Lünemann, Jan | Reconstruction Tools | Low energy muon reconstruction |  |  |  |  | 0.25 | 0.25 |
|   | **Lünemann, Jan Total** |  |  |  |  |  | **0.25** | **0.25** |
|  | Toscano, Simona | Reconstruction Tools | optimization of the geometry and the track reconstruction |  |  |  |  | 0.50 | 0.50 |
|   | **Toscano, Simona Total** |  |  |  |  |  | **0.50** | **0.50** |
| VUB PO | Detector Monitoring | Detector Monitoring |   | 0.06 |   |   |   | 0.06 |
|   | **VUB PO Total** |  |  | **0.06** |  |  |  | **0.06** |
| GR | De Wasseige, Gwenhael | Physics Filters | Optimization of hitspooling for SN and solar flares |  |  |  | 0.50 |  | 0.50 |
|  | **De Wasseige, Gwenhael, Total**  |  |  |  |  | **0.50** |  | **0.50** |
|  | Maggi, Giuliano | Reconstruction Tools | muon track reconstruction in IceCube and DeepCore |  |  |  |  | 0.25 | 0.25 |
|  | Data Quality | AGN analysis |  |  |  |  | 0.25 | 0.25 |
|  | Core Software | Software Strike Team |  |  | 0.25 |  |  | 0.25 |
|   | **Maggi, Giuliano Total** |  |  |  | **0.25** |  | **0.50** | **0.75** |
|   | VUB GR | Detector Monitoring | Detector Monitoring |   | 0.06 |   |   |   | 0.06 |
|   | **VUB GR Total** |  |  | **0.06** |  |  |  | **0.06** |
| **VUB Total**  |  | **0.20** | **0.12** | **0.25** | **0.50** | **2.25** | **3.32** |

**Vrije Universiteit Brussel**

**Catherine de Clercq**

**Ph.D Scientists** (Faculty Scientist/Post Doc Grads): **5** (2 3 2)

**Faculty:**

Catherine de Clercq Institutional Lead

Nick Van Eijndhoven Development of reconstruction tools (IcePack framework) - data quality verification

**Scientists/post-docs:**

De Vries, Krijn Muon track reconstruction in IceCube and DeepCore

 R&D on radio detection

Analysis topics: GRB/AGN analysis

Jan Lünemann Low energy muon track reconstruction

Analysis topics: WIMP analysis

Simona Toscano Optimization of the geometry and the track reconstruction, and GEN2 geometry optimization

Analysis topics: Development of a hybrid reconstruction for EHE (GZK) events using the In-Ice part of IceCube and the radio detectors

**Ph.D. Students:**

Maggi Giuliano Muon track reconstruction in IceCube and DeepCore, Software Strike Team

                 Analysis topics: AGN analysis

 Thesis topic: Search for high-energy neutirnos from dust-obscured Active Galactic Nuclei

Gwenhael De Wasseige Optimization of hitspooling for SN and solar flares

Analysis topics: Solar flares

 Thesis topic: Search for neutrinos from solar flares

**Diploma/Master Students:**

**Computing Resources**

**IIHE (ULB-VUB)**

|  |  |  |
| --- | --- | --- |
|  | **2016** | **2017** |
|  | **CPU Cores**  | **GPU Cards** | **CPU Cores** | **GPU Cards** |
| **IceCube**  |  | 14 | Up to 500 | 14 |
| **PINGU** |  |  |  |  |
| **Gen2**  |  |  |  |  |

The computing resources in the table are provided by the IIHE (ULB-VUB), i.e. by ULB and VUB together.

The 14 GPU cards are presently used for the production of MC samples for the collaboration. The jobs are launched centrally. From our side we cannot see whether the jobs run for IceCube, PINGU or Gen2.

We intend to also open access to CPU cores for the production of MC samples by the collaboration. This is now under development. Probably by next year a max of 500 cores could be made available. The number will increase gradually during 2016.

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