

Application to join the SHiP Collaboration

Rainer Wanke

Johannes Gutenberg University Mainz

SHiP Collaboration Meeting, Nov 23rd, 2016



JOHANNES GUTENBERG
UNIVERSITÄT MAINZ

JG|U

Who We Are

- **Volker Büscher:**

- Head of the Mainz particle physics group.
- ATLAS (BSM, Higgs, L1 trigger).
- CALICE (Analog Hadron Calorimeter AHCAL).



- **Michael Wurm:**

- Borexino, SOX (solar/sterile neutrinos).
- JUNO (neutrino hierarchy).
- Liquid Scintillators.



- **Rainer Wanke:**

- Kaon Physics (NA48, NA62).
- CALICE (Analog Hadron Calorimeter AHCAL).
- Calorimetry with plastic scintillators.



Who We Are - the Department

Department of Physics, Mathematics, and Computer Science with two physics institutes:

- **Institute of Physics:**

- Quantum Physics
- Condensed Matter (Experiment & Theory)
- Theoretical Particle Physics
- Experimental Particle and Astroparticle Physics
(ATLAS, NA62, Calice, XENON, IceCube, Borexino, Juno,...)

- **Institute of Nuclear Physics:**

- Nuclear and Particle Physics, Theory & Experiment
(PANDA, BaBar, BESIII, Compass, ...)
- Mainz Microtron MAMI: electron accelerator up to 1.5 GeV

Who We Are - the Group

Experimental Particle and Astroparticle Physics (ETAP):

- More than 100 scientists, including 8 full professors.
- **Topics:**
 - **ATLAS** (BSM, Higgs, SM, top; L1 trigger, muon system), **NA62, Calice**
 - **Neutrino physics** (Borexino, Juno, SOX)
 - **Astroparticle physics** (IceCube)
 - **Dark matter search** (XENON)
 - **Axion searches** (ALPS, Oscar)



PRISMA Cluster of Excellence:

- One of two clusters in Germany for research of basic questions about the nature of the fundamental matter and their importance for the physics of the Universe.
- Important for us: **PRISMA Detector Lab**
 - Personnel (physicists and engineers)
 - Laboratory space, including a photon detector lab with the corresponding infrastructure.
 - In addition a large construction hall is being built, allowing large-scale detector construction in the near future.



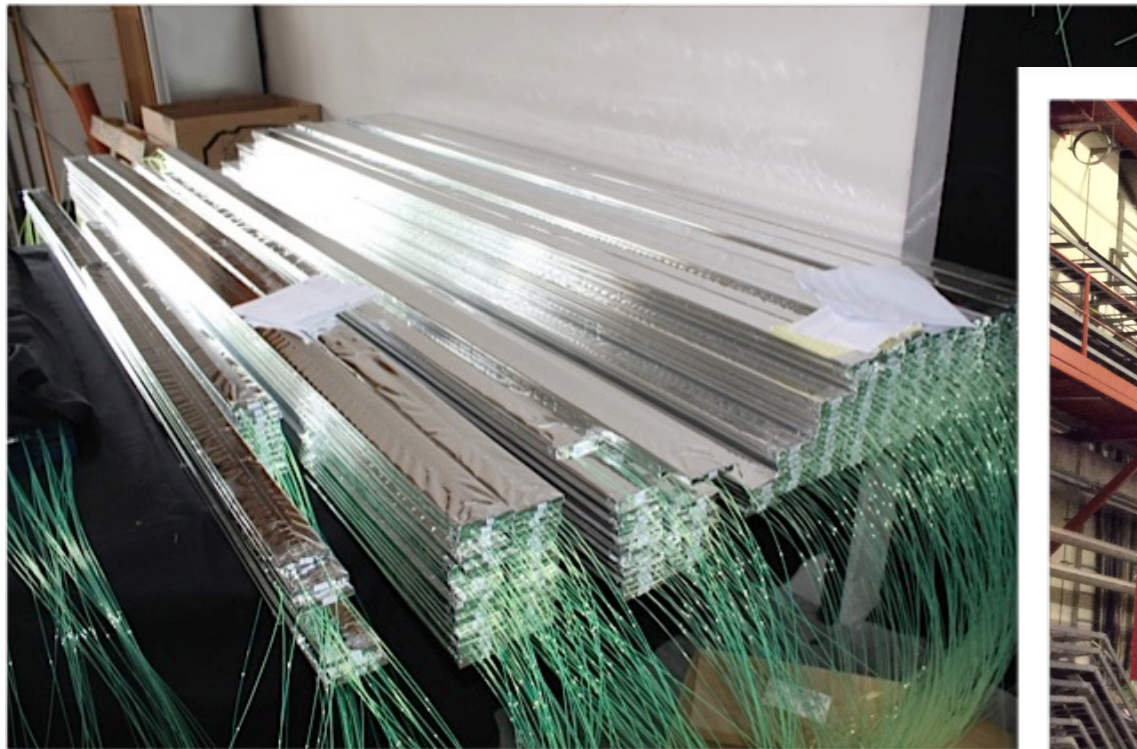
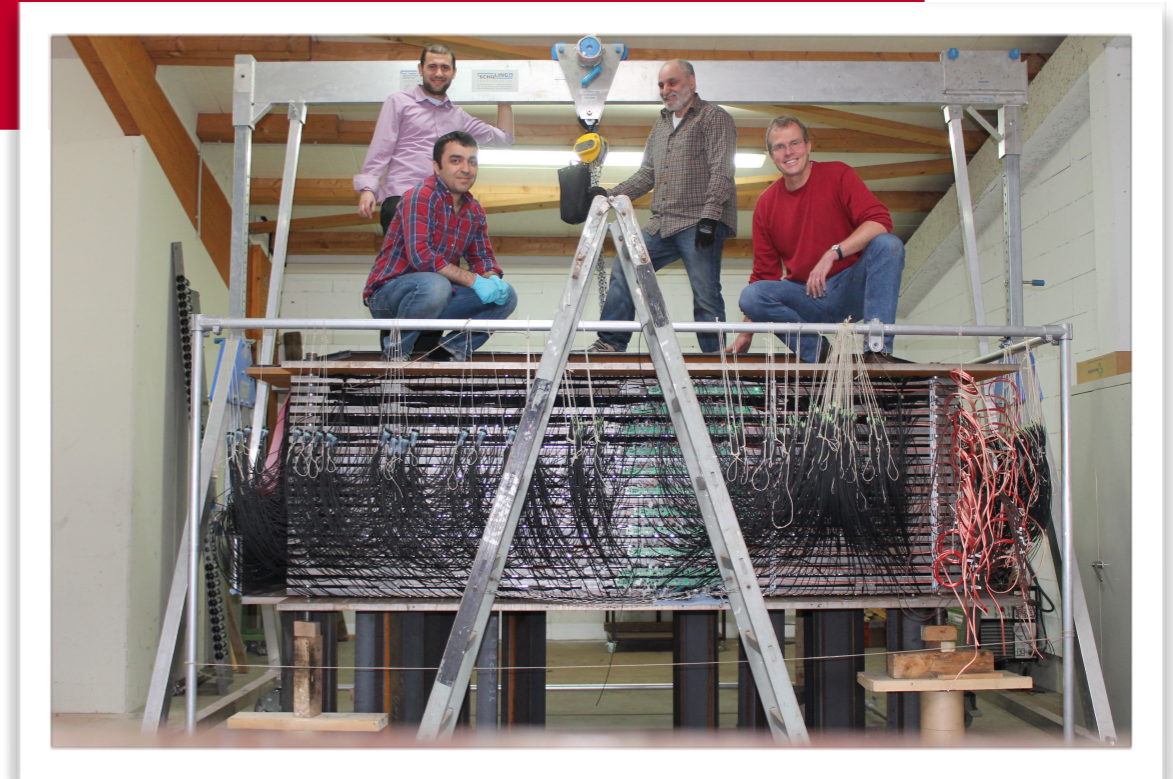
Cluster of Excellence Precision Physics,
Fundamental Interactions and Structure of Matter

PRISMA

Who We Are - Expertise

NA62 Muon Veto Detector:

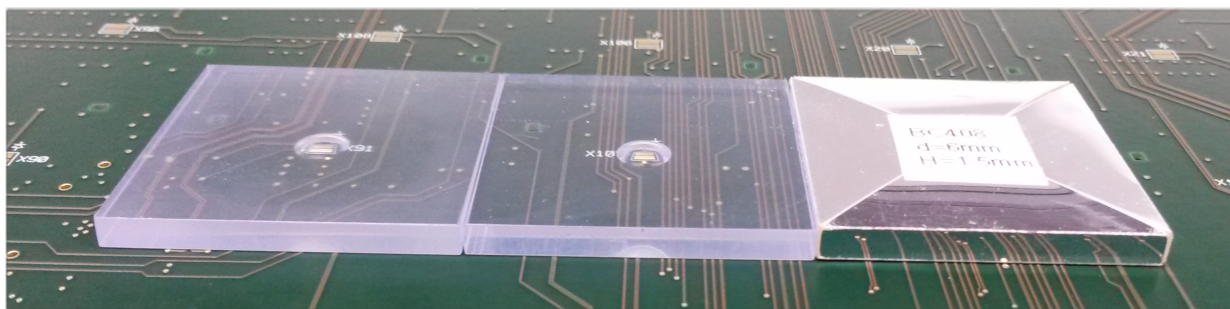
- Development & construction of an iron-scintillator sandwich calorimeter.



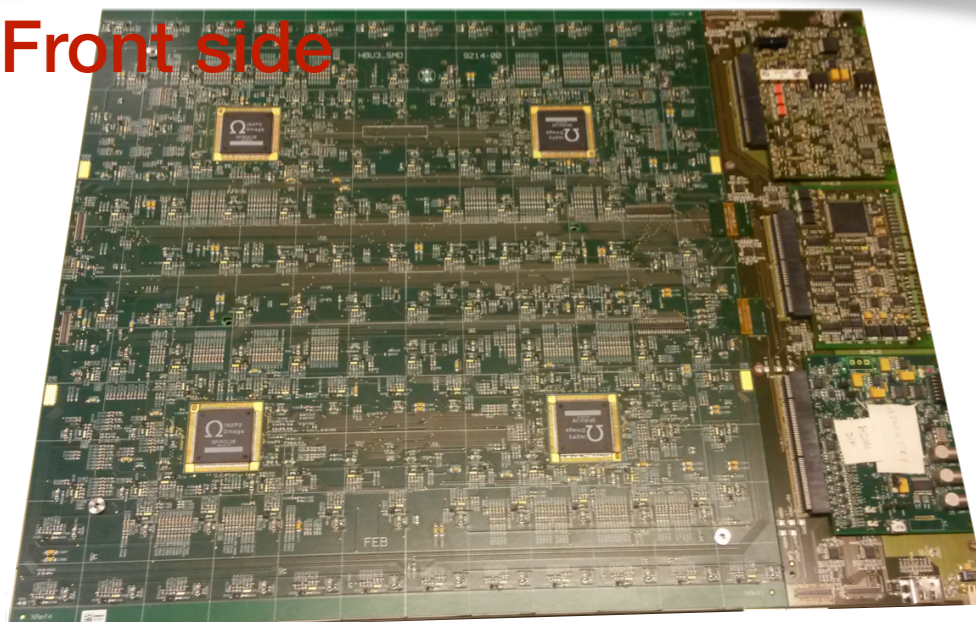
Who We Are - Expertise

CALICE AHCAL:

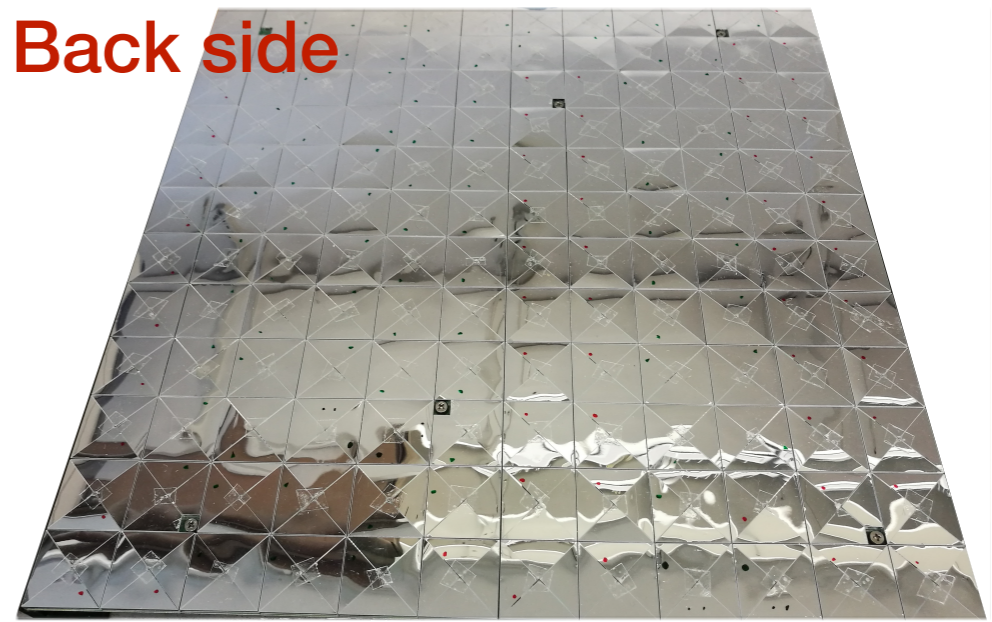
- High-precision high-granularity HCAL for future e^+e^- collider.
- SiPM read-out, tile design, mass assembly and testing.



Front side



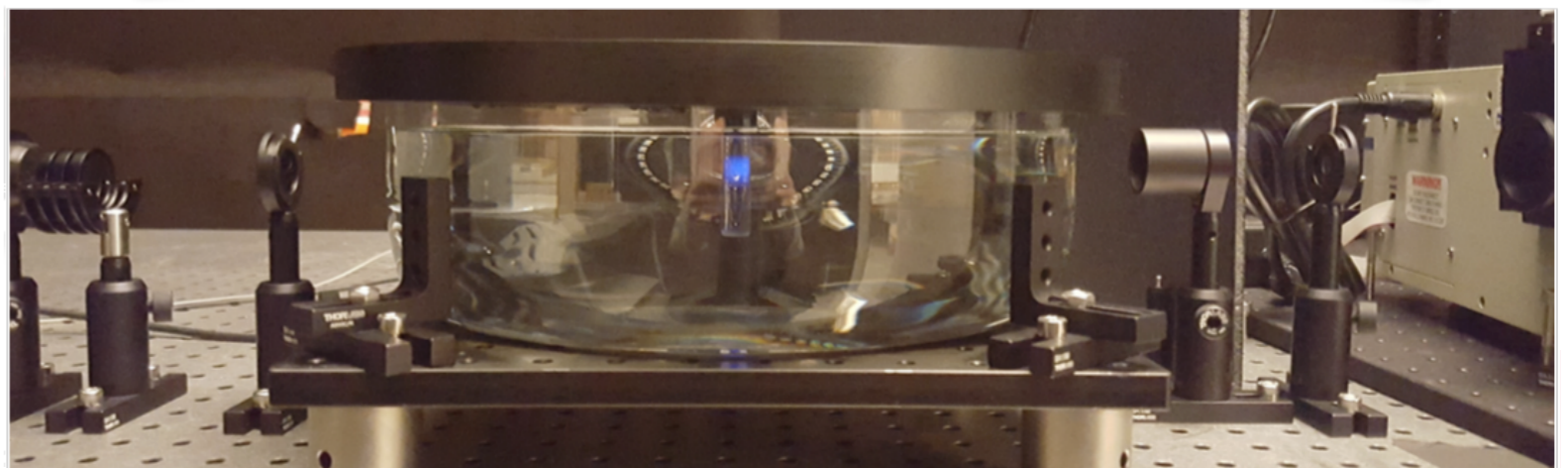
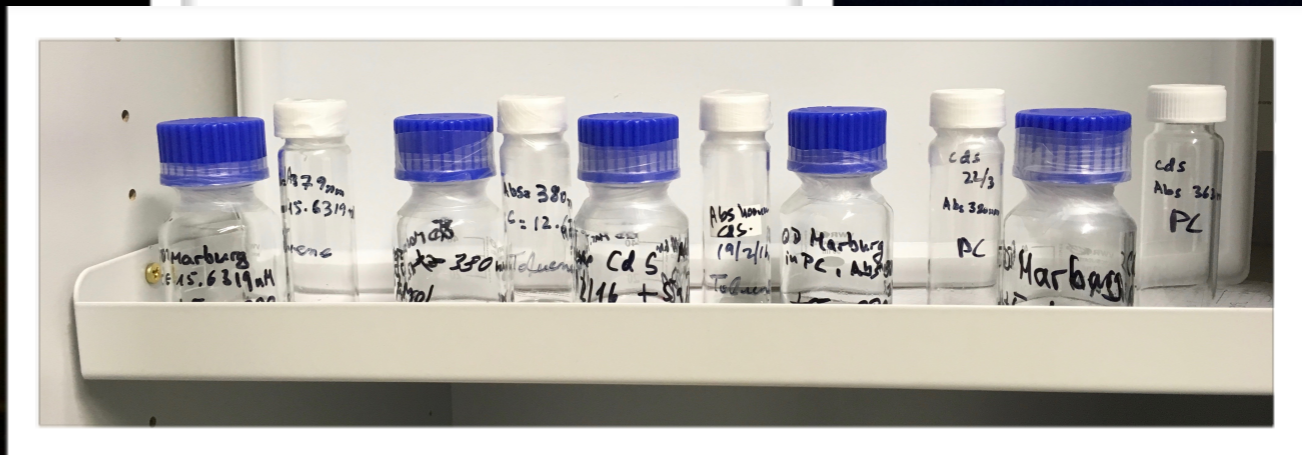
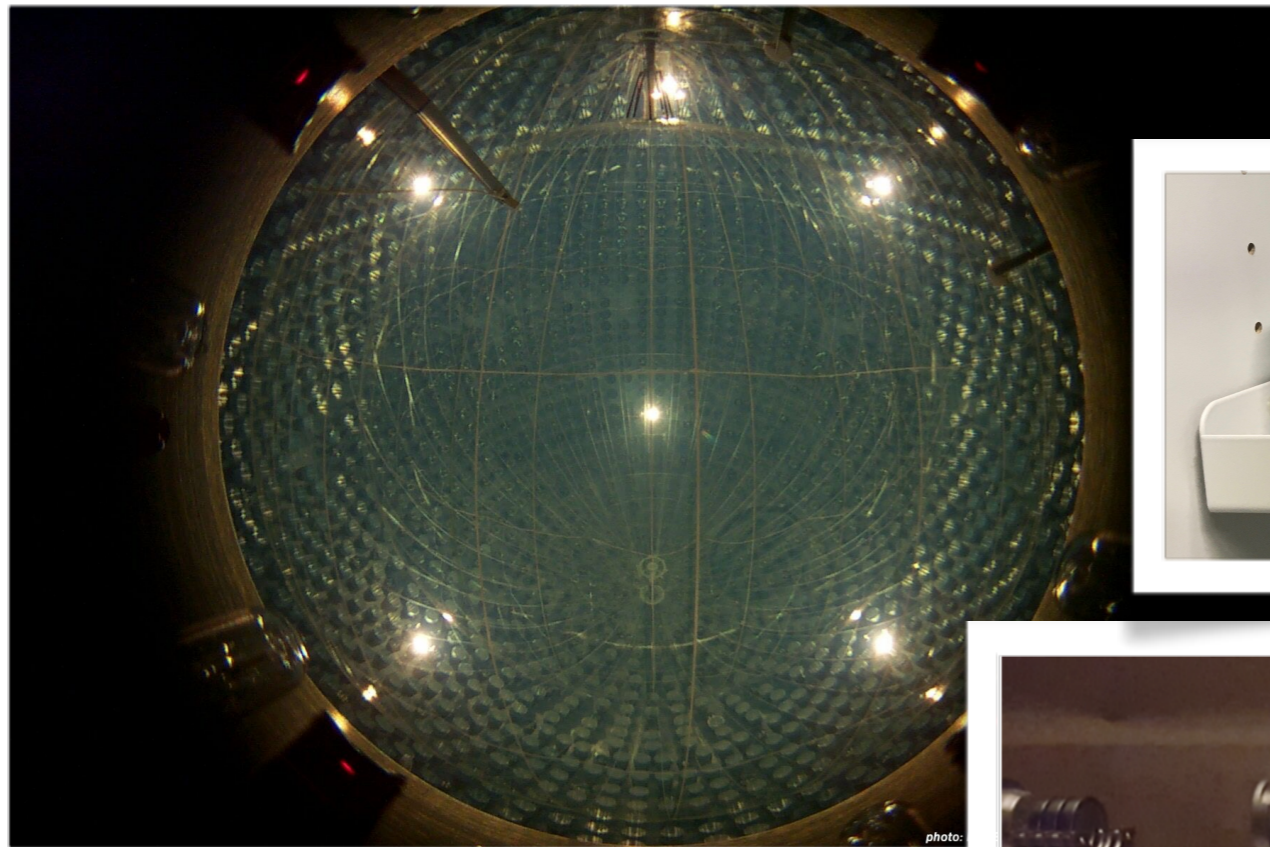
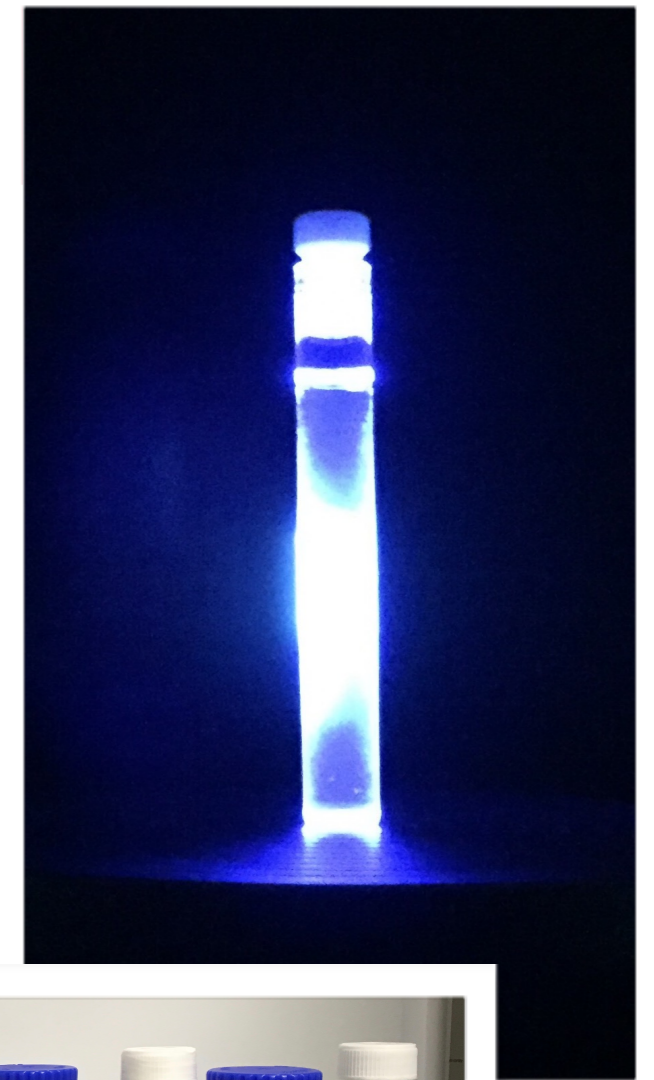
Back side



Who We Are - Expertise

Liquid Scintillators:

- Production, characterization and quality control.
- New scintillating materials.



Possible Mainz Contributions to SHiP

- Our strengths and interests are in calorimetry - therefore joining the **ECAL** or **HCAL R&D and construction** would seem natural.
 - One idea: exploitation of the possibility to obtain **directional information on electromagnetic showers** for the reconstruction of neutral decays.
- Also participation in the **SBT** would be very interesting for us.
- Finally we could participate in **detector simulations**.
- **Envisioned initial group strength:**
 - Three PIs (V. Büscher, M. Wurm, RW).
 - 1 post-doc, 1 PhD student.
 - Bachelor & master students + student assistants.
 - Mechanical & electronic technicians.