

Computational Capabilities at **Wigner RCP** & **evopro**: Potential Industrial Partner

ET Preparatory Phase WP8 – EIB

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Balázs Kacskovics⁽¹⁾, Dániel Barta⁽¹⁾,

László Á. Gergely^(1,3), Mátyás Zs. Vasúth⁽¹⁾, Péter Ván^(1,2), Zsolt Szepessy^(2,4)

(1) Wigner Research Centre for Physics; (2) Budapest University of Technology and Economics; (3) University of Szeged; (4) Evopro Innovation Labs Ltd.

Wigner Datacenter (WDC)



- CERN Worldwide LHC Computing Grid (**WLCG**) Tier-0 site from 2013 to 2020
- Running CERN (**ALICE / CMS**) experimental computing resources
- CERN and WDC connected by **three 100 Gbps** dedicated optical links
- Available computing capacity, provided energy bills are covered
- WDC commits for: **hardware and general maintenance; network diagnostics; expertise**
- **4MW** capacity, **full UPS** and **diesel coverage** for all IT load (incl. cooling)



Wigner Datacenter

Wigner Datacenter (WDC)

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Year	Category	Title	Author(s)
2020	Talks	Presented the APEX images produced using the Wigner cloud and complemented my presentation with the ALMA data	APEX Science
	Telescope Proposals	Three different proposals are being prepared using data and images produced using the Wigner cloud	ALMA 2020
2019	Published papers	Publication of the data of L1551 IRS 5	Cruz-Sáenz de Miera, F., Kóspál, Á., Ábrahám, P.
	Talks	Presented ALMA data and images produced using the Wigner cloud	Seminar at Universidad Autónoma de Madrid
		Presented ALMA data and images produced using the Wigner cloud	From Stars to Planets 2
		Presented the re-calibration of ALMA data and the higher quality images produced using the Wigner cloud	Interaction of Stars with their Environments
	Telescope Proposals	Three different proposals were submitted using the results produced with the Wigner cloud	ALMA 2019
2018	Posters	The Circumbinary Spiral Arms of L1551 IRS 5: A New Discovery with ALMA	IAU General Assembly
		The Circumbinary Spiral Arms of L1551 IRS 5: A New Discovery with ALMA	Take a Closer Look

Composed of the following facilities:

- **WLCG ALICE / CMS Tier-2 Site**

4000 vCPU (shared between CMS (2/3) and ALICE (1/3));
1.2 PB Storage
HEPSPEC6 hours: 342 439 409 (2021 / 2022)

- **WLCG ALICE Analysis Facility**

Re-utilizing the Tier-0 @ Budapest hardwares

4096 vCPU + 8192 GB RAM

Raw storage capacity: ~2.6 PB

Usable storage capacity: ~1.3 PB (Plasma Research Accelerator)

- **WSG Virgo Tier-2 Site / EuPRAXIA Site**

Re-utilizing Wigner Cloud hardware

1600 (usable: 1500) VCPU + 5120 GB RAM

CEPH FS storage capacity: 1 PB (raw) → 0.5 PB (usable)

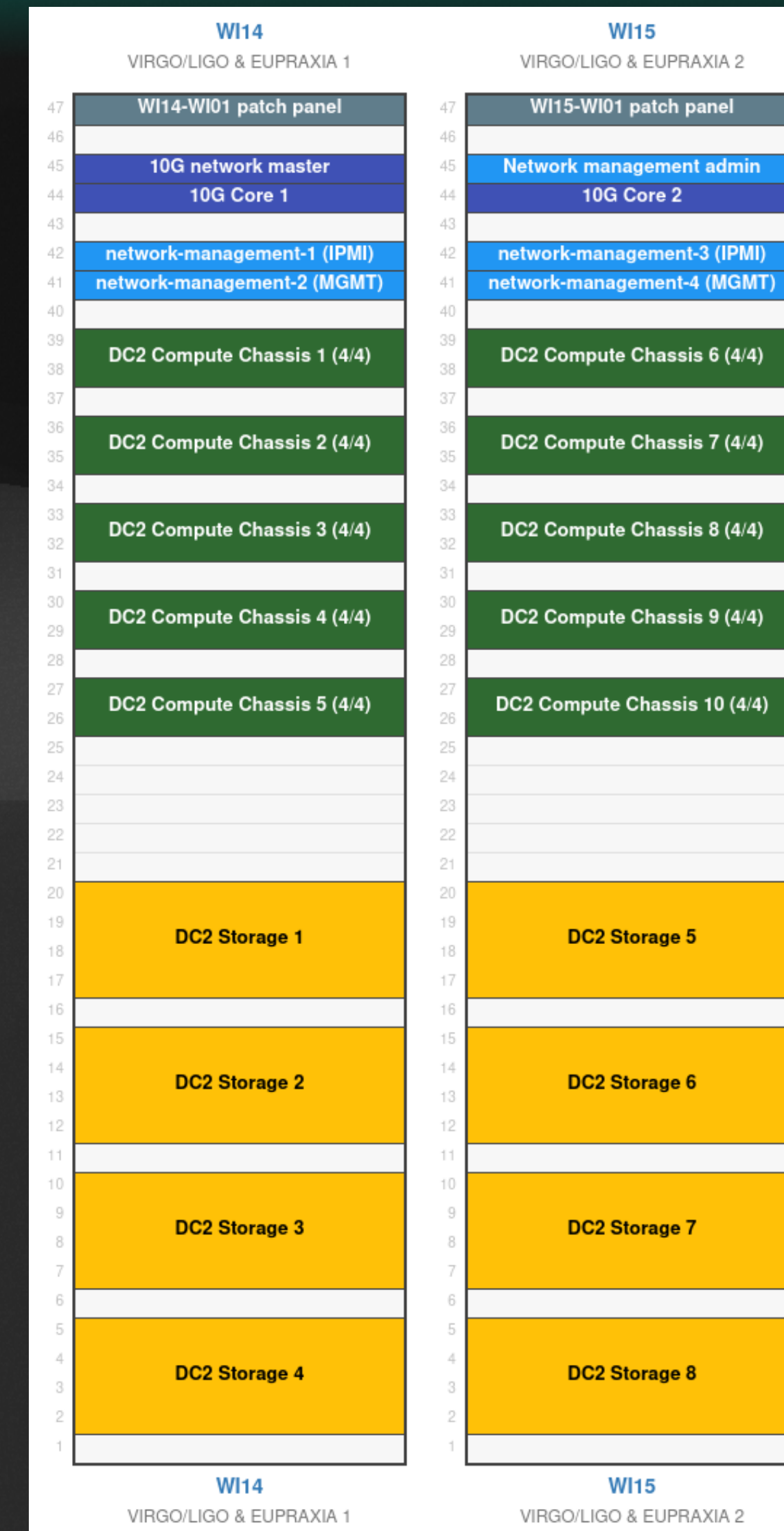
- **GPU Laboratory (grant-based projects may apply)**

Established in 2010 by G. G. Barnaföldi & G. Debreczeni & P. Lévai

Aim: GPU usage in HEP and Gravity + developing on new tech.

GPU Performance: ~526 TFLOP of single-precision & ~91 TFLOP double

- The machines of the GPU Lab are built to be a **testbed** for experimenting with GPU technologies and to **test algorithms** utilizing multiple cards.
- There are configurations hosting NVIDIA cards with CUDA support and OpenCL capable devices (in the form of AMD GPUs and Intel Xeon Phis).



Wigner Scientific Computing Laboratory (WSCLab)



Room1

Room2

WA

WB

WC

WD

WE

WF

WG

WH

WI

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WK

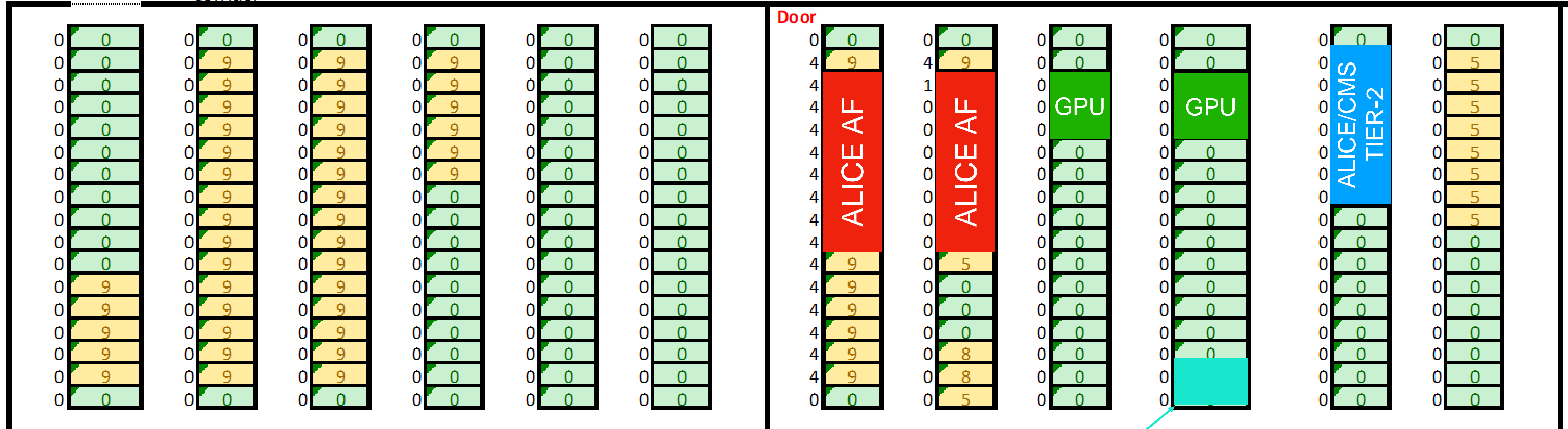
WL

Main door

corridor

Door

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VIRGO TIER-2/ EUPRAXIA

Competencies

- Cloud computation and services
National Cloud: **3000+ CPU** core + **GPU clusters**
Virgo Tier-2: **1600 VCPU, 1/2 PB storage**
- 22 years of experience with **CERN infrastructures and softwares**
- CERN ALICE / CMS Tier-2 Cluster (since 2003) — **TOP3 Tier-2** site for many years
- Network, Server, Cloud monitoring expertise (**Sensu**)
- High-performance computing:
 - ▶ **GPU**
 - ▶ **FPGA** (Quantum Simulators)

Mission

- Knowledge center
- Parallel computing workshops & events:
 - ★ **GPU Day**
 - ★ **Lectures on Modern Scientific Programming**
 - ★ **HEPTECH**
 - ★ **AIME**
 - ★ **ICT**
- AI / Machine Learning Research & Development
- Quantum Communication & Computation



Potential Industrial Partner for ET

Company details (www.eilabs.com)

- Engineering service firm based in Hungary (Budapest, Debrecen)
- employs 50 engineers (electrical engineers and technical IT specialists)

Competencies:

- Precision measurement technology
- Signal processing
- Analog and digital circuit design
- Embedded real-time software development
- Embedded security solutions
- Distributed software development
- Industrial software development
- Software development in cloud environment

Business areas:

- Industrial software development
- Railway diagnostics
- Large-scale physics instrumentation & control



Membership:

- The European Rail Supply Industry Association - **UNIFE**
- European Institute of Innovation & Technology - **EIT Digital**
- High Performance, Edge And Cloud computing - **HiPEAC**

Certifications:

ISO 9001, ISO 14001

Contact:

Zsolt Szepessy, PhD
Managing director

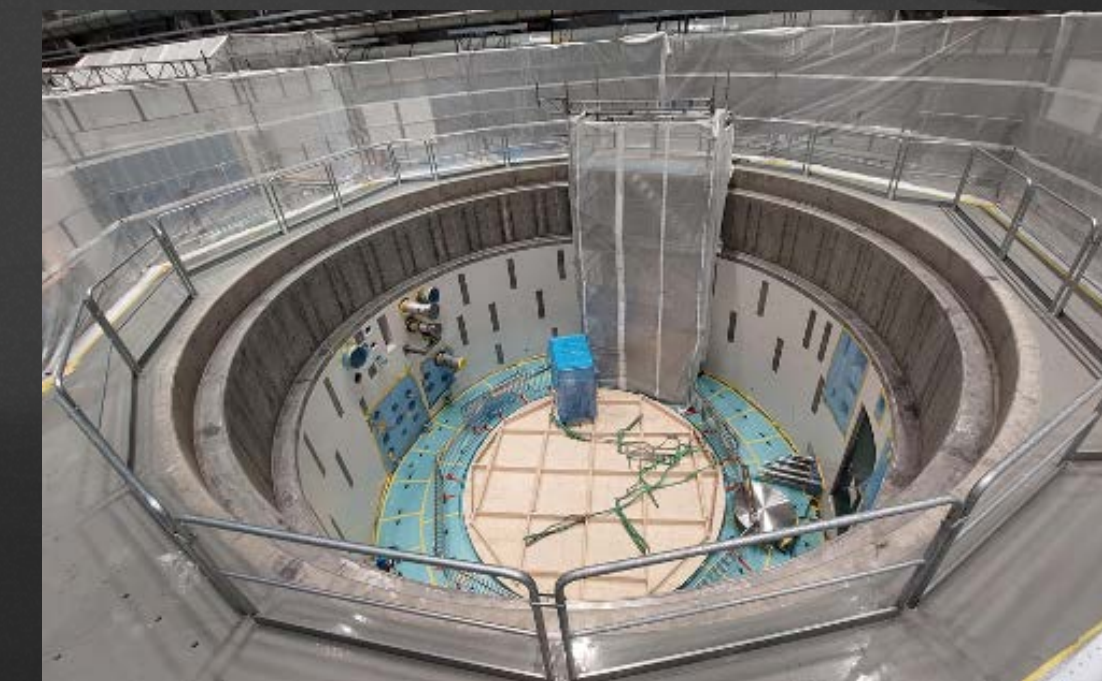
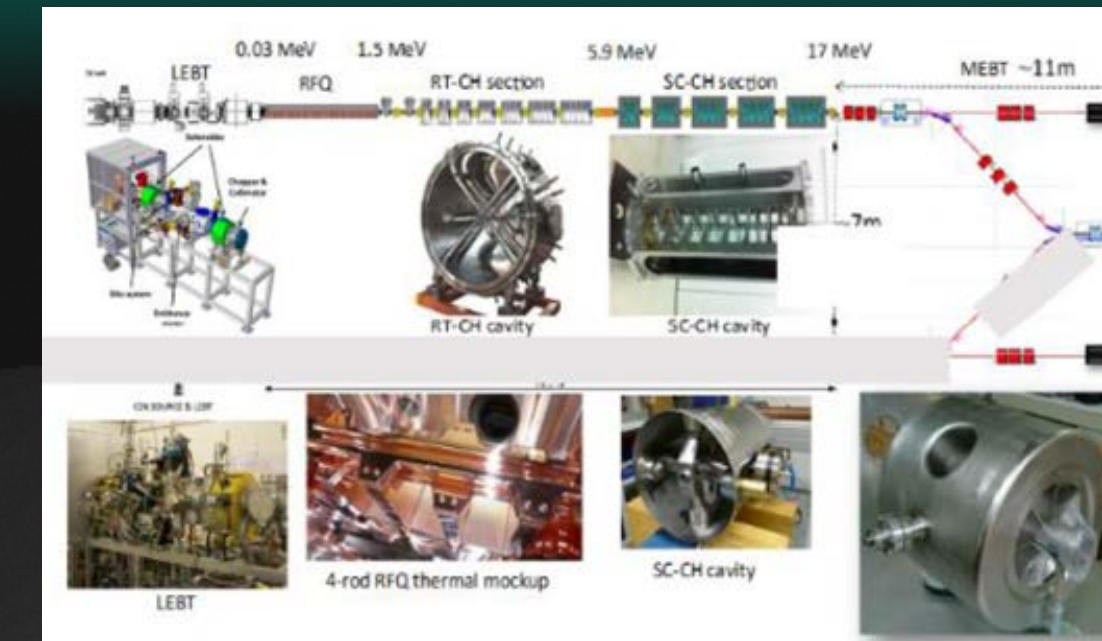
zsolt.szepessy@eilabs.com

HU, 1221 Budapest, Hauszmann u. 2



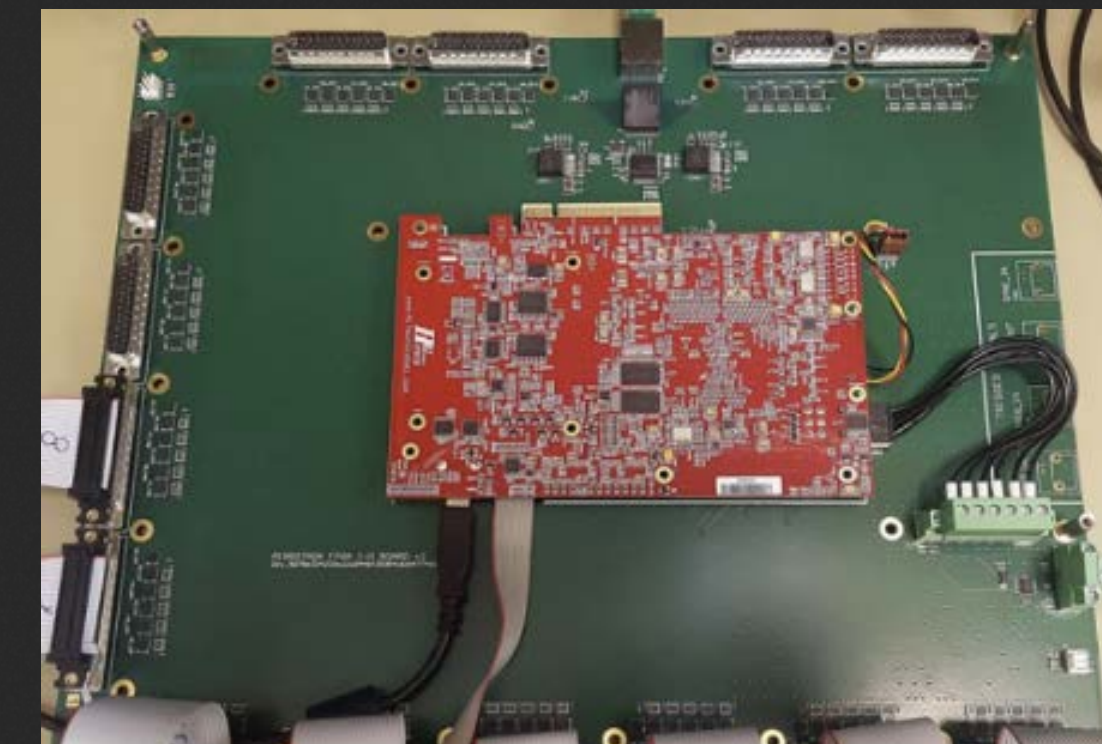
Contributing to Big Physics Infrastructure

- **SCK CEN MINERVA 2021 – 2026**
MCS control system development for LRI of SCK CEN Software development, firmware development, EPICS middleware development
- **ESS 2017 – 2026**
Instrumentation and control development for ESS Software development, PLC and FPGA based control design
- **MVM PAKS nuclear plant 2017 – 2020**
Universal Test System development for the reactor protection system Software development, system analysis
- **Mirrotron 2DDAQ 2018 – 2022**
Development of 300 channel signal acquisition system for SANS detector FPGA board, firmware and processing software development



European Research project participant

• REPARA	FP7	609666	2016
• ARROWHEAD	FP7	332987	2017
• REPHRASE	H2020	644235	2018
• PRODUCTIVE 4.0	H2020	737459	2020
• ARROWHEAD TOOLS	H2020	826452	2022
• IN2ZONE	H2020	101014571	2023



Summary



Two potential interesting partners for ET

- ◆ **Wigner Datacenter**
- ◆ **evopro Innovation Labs Ltd.**

Thank you for your attention!