**Summary of the visit of the FCC delegation to Wigner Research Centre for Physics**

**7 June, 2016**

FCC Delegation: Michael Benedikt (FCC Study project leader), Brennan Goddard (CERN TE-ABT group leader).

The aim of this visit was to

* present the Future Circular Collider study and the very wide range of R&D activities and opportunities in different scientific and technological areas (not necessarily related to FCC) where CERN is looking for scientific or industrial partners for collaboration
* present the activities of different research groups and the capabilities of Hungarian industrial partners

and thereby catalyze possible collaborations or industrial contracts between CERN and Hungary.

**CERN FCC**

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A keyword-style list of R&D activities and opportunities, potentially interesting subjects in bold:

* 16 T dipole magnets, Nb3Sn technology
* Superconducting radiofrequency
* Radiofrequency power sources, increasing power conversion efficiency
* Handling synchrotron radiation impact on beam screens, **coatings**
* Fast pulsed systems (rise-time: 5 ns – 3 μs; up to 20 kA, 80 kV)
  + **laser triggering of semiconductor switches**
  + high-performance capacitors
  + **radiation resistance of electronics**
  + magnetic materials
  + topologies
* Septum magnets
  + High-field normal-conducting septa: high saturation materials, active leakage field compensation, mechanical engineering,
  + **Superconducting shields for special magnets** (established collaboration with Wigner, made possible by the support of Engious Ltd)
* Distributed electronics for controlling machine hardware
  + **radiation resistance**
  + reliability, availability and redundancy
  + modularity
  + **machine learning, analyzing hardware data and signals**
* Electrostatic septa
  + **Carbon fibres or nano-tubes for anode wires** to minimize beam loss (it did not match the activity of any of the groups/companies being present, but I can imagine there could be interest for this topic in Hungary)
  + Cathode materials
  + High-voltage performance
  + Energy deposition simulations
  + **Thermo-mechanical design and optimization of very long and precise structures**
* Fast kicker magnets
  + Electromagnetic design
  + high saturation, high Curie temperature ferrites
  + impedance shielding
  + field quality and rise time
  + **insulator materials, surface treatment** (it did not match the activity of any groups/companies being present, but I can imagine there could be interest for this in Hungary – BME?)
  + high-voltage performance, UHV

**Gaseous detectors (MWPC and GEM)**

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**DAQ electronics lab, radiation-hard electronics (for ex. Alice DDL cards, etc)**

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**AWAKE plasma diagnostics**

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**Solid state physics, lasers (laser triggering of semiconductor switches)**

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**Machine learning, data analysis**

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