TF1 Symposium Q&A

We kindly request that you write your questions here, and please include your name. If your questions are addressed to a particular speaker please indicate it with @speaker_name. We will be monitoring the page during the day (and after) to reply to questions and include your input.

Input to the task force can also be put into the section at the bottom of this document, or sent to the task force at ECFA-DetectorRDRoadmap-TF1GaseousDetectors at cern.ch .

Symposium link: https://indico.cern.ch/event/999799

Questions:

Session: Technologies: overview, limitations and perspectives

Talk 1: MPGDs: GEM, Micromegas, THGEM, uRWell and other ongoing developments
Speaker: Eraldo Oliveri

Speaker's Questions for Discussion:

Questions to the speaker:

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Talk 2: **RPC, MRPC and other ongoing developments** Speaker: Giulio Aielli

Speaker's Questions for Discussion:

Questions to the speaker:

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Talk 3: **Drift chambers, straw tubes, TGC, CSC and other wire chambers**

Speaker: Peter Wintz

Speaker's Questions for Discussion:

Questions to the speaker:

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Talk 4: **PID: TPC, TRD, RICH and other large area detectors** Speaker: Emilio Radicioni

Speaker's Questions for Discussion:

Questions to the speaker:

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Session: **Future applications**

Talk 1: **Tracking and muon detection at future colliders** Speaker: Maxim Titov

Speaker's Questions for Discussion:

Questions to the speaker:

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Talk 2: **TPCs at future lepton and lepton-hadron colliders** Speaker: Piotr Gasik

Speaker's Questions for Discussion:

Questions to the speaker:

- Just a comment, on the matter of IBF, we are testing a GEM with a micromegas “bulked” on it to suppress IBF of a GEM while keeping GEM preamplification and diffusion, it’s promising. -M. Vandenbroucke - IRFU
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Talk 3: **Nuclear physics (tracking, extremely low mass detectors, photon detection, TRD, neutron detection)** Speaker: Stefano Levorato

Speaker’s Questions for Discussion:

Questions to the speaker:
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Talk 4: **Recoil imaging for DM, neutrino, and BSM physics applications (TPCs variations, optical readout)** Speaker: Diego Gonzalez Diaz

Speaker’s Questions for Discussion:

Questions to the speaker:
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Talk 5: **Calorimetry (RPC, MPGD) at future colliders** Speaker: Frank Simon

Speaker’s Questions for Discussion:

Questions to the speaker:
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Session: Challenges and new developments

Talk 1: **Detector stability (ageing, discharge issues) and rate capability: resistive electrodes**
Speaker: Mauro Iodice

Speaker's Questions for Discussion:

Questions to the speaker:

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Talk 2:**Precision timing detectors** Speaker: Piet Verwilligen

Speaker's Questions for Discussion:

Questions to the speaker:

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Talk 3:**Optical readout, novel readout electrodes, hybrids with ASICS**
Speaker: Florian Maximilian Brunbauer

Speaker's Questions for Discussion:

Questions to the speaker:

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Talk 4: **IBF, photocathode stability and alternatives (including solid converters and nanotech)**
Speaker: Fulvio Tessarotto

Speaker's Questions for Discussion:

Questions to the speaker:

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Talk 5: **Precision manufacturing techniques (electrical and mechanical properties of detector components), additive manufacturing and new materials (low mass, radio-purity)**
Speaker:Atsuhiko Ochi

Comment (Florian Brunbauer, CERN): Additive manufacturing techniques (3D printing, FFF, SLA, inkjet, …) may allow for novel electrode geometries - both for amplification devices as well as readout electrodes. A critical requirement is the achievable spatial resolution and the availability of manufacturing techniques to deposit both insulating as well as conductive materials, ideally in the same deposition process. State-of-the-art technologies already achieve µm-level resolution but further developments on multi-material capabilities and scaling to larger areas is required.

Speaker's Questions for Discussion:

Questions to the speaker:

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Talk 6: **Eco gas mixtures and mitigation procedures for GHG gas (recirculation, recuperation etc)**
Speaker: Beatrice Mandelli

Silvia Dalla Torre (INFN-Trieste) to Everyone (3:56 PM)
comment: for RICHes: also proposal to use pressurized Ar instead of C-F gasses

Speaker's Questions for Discussion:

Questions to the speaker:

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Talk: **Application beyond fundamental research**
Speaker: Fabrizio Murtas

Speaker's Questions for Discussion:

Questions to the speaker:

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Session: Development tools and R&D environment

Talk 1: **Electronics (front-end and DAQ) for gaseous detectors R&D**
Speaker: Hans Muller

Speaker's Questions for Discussion:

Questions to the speaker:

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Talk 2: **Software tools for detector physics simulations**
Speaker: Heinrich Schindler

Speaker's Questions for Discussion:

Questions to the speaker:

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Talk 3: **Infrastructure – development, testing and production facilities**
Speaker: Rui De Oliveira

Speaker's Questions for Discussion:

Questions to the speaker:
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Talk 4: **Relations with industry** Speaker: Michele Bianco

Speaker's Questions for Discussion:

Questions to the speaker:

Talk 5: **Networking – collaborations, technology dissemination and training**
Speaker: Leszek Ropelewski

Speaker's Questions for Discussion:

Questions to the speaker:

From **Barbara Liberti** in Chat of zoom: About this, unfortunately, the development of FE electronics for R&D of other detectors has been left out. For the development of the RPCs of our group I would like to point out the contribution of Roberto Cardarelli starting from: "Performance of RPC and diamond detectors using a new very fast low noise preamplifier" (R Cardarelli et al 2013 JINST8 P01003). Thank you.

Wrap-up

https://docs.google.com/document/d/1CcN-izgdm2tktrUYvYOfNO93tbDg06xpCWWOFbT43R4/edit?usp=sharing

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Comments or Inputs for the Task Force

If you have any inputs or comments you would like to share with the TF members, feel free to write them below. Alternatively, you can also email us (Anna.Colaleo@cern.ch or Leszek.Ropelewski@cern.ch) or the whole task force:

ECFA-DetectorRDRoadmap-TF1GaseousDetectors@cern.ch

Emilio Radicioni

One comment: a key asset would be the availability of image-intensified TimePix devices, or similar, for optical TPC studies. These are not the devices one could develop independently in this community.

Maxence Vandenbroucke

From my understanding this conference will lead to a document including a roadmap for our field. Most of the presentations were a great inventory of what is going on now in the labs (with a small bias toward CERN/Italy activities).

My concern is that the roadmap will be an extrapolation for what is being already done in the labs, which is an optimisation of whatever small part of our detectors; for me this R&D is already done in the labs where funding is based on ideas from researcher of the lab floor (like myself).

What would really help I think, is to have clear goals to be reached for the futur of physics, not something that is more of the same. I know that in one fields like quantum computing, there are prices with a little money for reaching technological goals. I would love to see a list of what is really needed for breakthrough, regardless of what is achievable today, something like : for timing detectors, we need planes of few sq that reach 0.1 ps.

My feeling is that our community need goals and competition to invent the future.