

## Halina:

We are obviously very interested in being part of AIDA++. We did not have the time to have an in depth discussion - all seem to be very busy. Yan brought up the idea of working on edgeless sensors for calorimetry. I think the previous EU projects got us to a design of a really compact calorimeter, however we could never study in depth the uniformity of the response. From early tests, we saw a drop of 10% across the pads. This would be a good time to reexamine the problem.

When we first thought about it, Yan contacted Hamamatsou but it didn't go very far. We would have to investigate the industry potential.

That's as much as we can come up with for now. Maybe Yan can add to it.

Since Wierba left, we did not have any progress on alignment either - also food for thought.

Yan wanted to also explore sapphire calorimeters. They could be good for flux monitoring.

## Wolfgang:

we need a research goal which is challenging, and has appeal, e.g. calorimetry with high spatial and time resolution (for luminosity measurement at future collider)

whether the half sentence in parentheses should be added or not depends a bit where we all want to go in future. to be discussed. e.g. application at Luxe might be a point.

i consider as interested laboratories ISS Bukharest, CERN, Cracow, Kiev and Tel Aviv. DESY i don't know, what Sergey mentioned was not very promising.

hence, the research program must match the interests and expertise in this labs such that at the end the result is more than the sum of each...., as usual.

then, some key-parameter should be defined for potential applications. we know the spatial resolution requirements for a luminometer at ILC and CLIC, we know the 'bias problem' in a cylindrical calorimeter, to be understood in data.

timing requirements at a ILC like machine are relaxed, apart of 'fast feedback', at CLIC it is different. do we have good reasons to require that the shower must be time-related to a few bunch crossings?? at least it might be essential to have a sufficiently fast readout not to suffer by pile-up.

timing requirements at circular collider i don't know, should be found out. also about requirements on time resolution at LUXE i have no idea.

for a realistic prototype we need a readout which is compact, not what we have today. i would call this 'miniaturisation', it should be is size sufficiently small to match in the already crowded forward region of any detector. marek may find a proper concept how to go in this direction.

as an starting point we may cover the following technological challenges:

1. highly compact calorimeter, to get spatial shower precision on top of background. i think, even that we have thin prototype detector planes the technology can still be refined, e.g. develop reliable planes with stub-bonding
2. sensor development. e.g. edgeless sensors as proposed by halina and Yan.
3. fast ASICs to obtain sub-nanosecond time resolution.

#### 4. miniaturisation of the readout

##### **Veta:**

A topic for AIDA++ where ISS might involve would be experimental data analysis. I'm thinking of the experimental data from the sensors before they are assembled in the calorimeters and after the TB experiment. We should involve in testing of the update/new calorimeters prototype.

Taking into account that Transnational Access is no longer acceptable in the next project, I want to make sure that we can continue to participate in TB campaigns.

Of course, simulations can be a point of interest for ISS. From the AIDA ++ ISS can allocate funds to acquire some hardware components (e.g. sensors, connector, cable, etc.) that will be part of the future luminometers.

##### **Anton:**

We also could add the "GaAs sensor" topic for discussion/proposal!

##### **Marek&Company:**

- fully agree with Wolfgang that we need challenging goal – but realistic!
- compact calorimeter with energy, spatial and time resolution seems interesting idea, 'miniaturisation' could be one of the keywords
- possibly a new appealing feature could be also continuous readout – interesting for FCC-ee mainly
- direct solution for CLIC is more difficult to propose since, even if we get good time resolution, the high occupancy and pileup would need to be study better to understand whether present detector concept can work well
- how far are we in specifications from other applications, like LUXE, to propose something like this directly in our proposal ?
- should we mention (to which extent) in our proposal specific points regarding data analyses (like ideas from Halina) ?
- few considerations regarding main hardware features:
  - a) spatial resolution affects sensor granularity – proposing new finer sensor may be quite expensive and somebody would need to work on it ..., of course edgeless sensors are interesting
  - b) what about other sensors (GaAs) ?
  - c) time resolution – with deconvolution we do at AGH it would be rather 1-5ns, for sub-nanoseconds different approach would be needed