

## Minutes of WP-meeting 459

### Attendance:

Zoom: Purba Bhattacharya, Paul Colas, Jochen Kaminski, Huirong Qi, Ron Settles, Jan Timmermans

### General News:

Purba joined her first meeting, after joining the LCTPC Collaboration.

In the last ILD Meeting Analysis and optimization meeting Daniel Jeans reported on his background simulations. He will also give a talk during the FCCee-Meeting at Helsinki during the session starting today at 14:00. (<https://indico.cern.ch/event/1552126/timetable/>).

### News from the groups:

Paul talked about his trip to Japan. He met many (former) colleagues there: Makoto Kobayashi, Katsumasa Ikematsu, Rita Takahashi, the former KEK secretary, who is also organizing the LCWS in November, Shinya Narita, Serguey Ganjour, Kanako Watanabe. Among many other things, he discussed with Daniel Jeans and Belle2 people, what could be learned from the Belle2 CDC about the backgrounds for the FCCee situation. But the background of Belle 2 and main tracker of FCC will have very different sources. The two main groups of sources are single beam backgrounds consisting of synchrotron radiation backgrounds and other background depending on  $1/E^3$  like the Touchek background and the beam gas background. The other large group is the luminosity background, which depends on the luminosity. The main contributor here is the gamma-gamma background. As several of these background sources strongly depend on the beam energy, the help of Belle2 for estimating and preventing the backgrounds is unfortunately limited. Some of the backgrounds we would see in the TPC, also depend on the gas we are using, as for example a hydrogen rich gas is much more sensitive to neutrons, than one without hydrogen.

Huirong showed the gas parameters of He:CF<sub>4</sub>:iC<sub>4</sub>H<sub>10</sub> 95:3:2 and Ne:CF<sub>4</sub>:iC<sub>4</sub>H<sub>10</sub> 95:3:2 simulated with MAGBOLTZ. Neon has a maximum of the drift velocity at about 450 V/cm, of about 6 cm/μs (TDR gas: 285 V/cm, ~8cm/μs), the diffusion is also slightly higher at this point: 80 μm/sqrt(cm) compared to 50 μm/sqrt(cm) with T2K. But helium is significantly more difficult as it has no maximum of the drift velocity. There is also an interesting paper on arXiv by the CYGNUS collaboration: "He-CF<sub>4</sub>-CH<sub>4</sub> ternary mixtures as target gas for the CYGNO directional dark matter experiment" (<https://arxiv.org/pdf/2606.01512>). The lower number of ionization could also help to improve the cluster counting also in a TPC. A paper on this from the drift chambers is here: "Enhancing particle identification in helium-based drift chambers using cluster counting: insights from beam test studies" (<https://inspirehep.net/files/6caf555d23fa43311840b54af95741e8>)

Finally, there was also a report on the GEM production at the FTD in Bonn: <https://arxiv.org/abs/2606.03295>.

### AOB:

The next workpackage meeting will take place on June 25<sup>th</sup>.