Minutes from the Hyperon Meeting

2014-10-14

Participants:

Simone Esch, André Goerres, Dariusch Deermann, Vasily Mochalov, Albrecht Gillitzer, Michael Paperbrock, Elisa Fioravanti, Stefano Spataro, Karin Schönning (chair).

1. Round-the-table presentation

Everyone presented themselves by name, institute and hyperon interest.

Simone Esch, Juelich: performed Lambdabar Lambda studies which are presented in her Ph.D. thesis. Does no longer work with hyperon simulations but is probably the one with the most experience of running simulations with Pandaroot.

André Goerres, Juelich: Is doing a hardware based thesis but will include a part about simulations of excited Cascades decaying into Kaons and Lambdas. Will most likely start working on the simualtions in November.

Dariusch Deermann, Juelich: Is finalizing his thesis which includes a part on single-charmed hyperons. May give a progress report at the next meeting.

Vasily Mochalov, Protvino: Interested in inclusive hyperon production. Is currently occupied with other softwate tasks but will start working on hyperon simulations next year.

Albrecht Gillitzer, Juelich: As the convener of baryon spectroscopy he is interested in all hyperon channels, also the "less fancy" channels containing light, ground state, single-strange hyperons. Can contribute to simulation work for the scrutiny campaign if appropriate macros can be provided.

Michael Papenbrock, Uppsala: Has recently started working on pattern recognition and tracking in the barrel part in order to make the code functioning also for particles originating far from the interaction point.

Elisa Fioravanti, Ferrara: is looking into Lambdabar Lambda in the forward tracker, to study the importance of the FTS.

Stefano Spataro, Torino: As the computing coordinator he is interested in having a reconstruction code that works well for ALL kind of physics channels, including hyperons.

Karin Schönning, Uppsala: Interested in all ground state hyperon channels, mainly to study spin observables.

2. Organisation

- We will from now on have a meeting every three weeks on Tuesdays at 10.00. Next meeting will be on November 4th.

- We will opt for a dedicated Hyperon session at the next collaboration meeting. It should not overlap with the computing session nor the MVD session and should preferably be on Tuesday or Wednesday.

- A mailing list has been created, please subscribe at http://www-listserv.gsi.de/cgi-bin/wa?A0=PANDA-HYPERONS

- Forum: we will also have a dedicated hyperon forum.

- Wikipage: Sub-page of the baryon wikipage.

3. The scrutiny campaign

People who can do some work for the scrutiny campaign: Karin (work already ongoing), Dariusch and Albrecht (if macros are provided), André can start doing simulations in November, and probably also Walter (Ph. D. student in Uppsala). Elisa and Dariusch have done some simulation work but not for the scrutiny campaign. However, some results could still be of interest for the scrutiny group – let's have a look into that.

The fast simulation branch does not work for particles which do not come from the interaction point. Instead, one can run full simulations with different parts of the detectors removed. Karin can provide some macros for this. For signal channels, about 10000 events is enough.

4. Example: Performance study of the pbar p -> Omegabar Omega channel

This was presented as an example of how a quick study for the scrutiny campaign can be done. It still needs to be verified how reliable the numbers are but qualitatively they should give a good idea of which subdetectors are necessary.

From studies of both Omega and Xi, as well as Lambdas (the latter presented at the CM in June) it is clear that the MVD/GEM is absolutely necessary whereas the FTS is also very important. The efficiency drops to about 1/3 of that of the full setup if the FTS is removed, whereas the efficiency is more or less zero without the MVD/GEMs.

5. Beyond the scrutiny campaign: Long-term plans

The pattern recognition code needs to be adapted so that it can handle also channels containing displaced vertices. Uppsala and Pavia have recently started discussions about this and will collaborate in order to achieve this.

Pattern recognition for the FTS is also needed, but according to a report at the last CM, the Giessen group is working on this.

At least for light hyperon channels (involving Lambdas and Sigmas) the strong forward-backward peaking angular distributions at larger beam momenta mean that many of the events contain pions with very low momenta, many of them too low to be constructed. It is being investigated (by Karin with help from Stefano) if this can be improved by running with half magnetic field. The Genfit2 tracking code may also improve the situation. However we need to find out how large part of this problem is due to tracking (and can be improved) and how large part is due to the detector itself.

The new Physics Book: for the new Physics Book (will be written in about 2 years from now?) we should opt for presenting hyperon simulation studies performed with Pandaroot under as realistic conditions as possible (pattern recognition for example).