



# Minutes of the LIU-PS BD WG #29 on the 11<sup>th</sup> of April 2019



**Agenda** (<https://indico.cern.ch/event/812593/>)

1. *Emittance blow-up due to KFA14*
2. *AOB*

## **Present:**

Fanouria Antoniou, Foteini Asveta, Hannes Bartosik, Denis Cotte, Heiko Damerau, Marc Delrieux, Matthew A. Fraser, Gian Piero Di Giovanni, Klaus Hanke, Alexander Huschauer, Myrsini Kaitatzi, Alexandre Lasheen, Salim Ogur, Branko Popovic, Haroon Rafique, Giovanni Rumolo, Christine Vollinger, Ben Woolley.

## **1. Emittance blow-up due to KFA14**

Matthew has continued his analysis (presented in September '18 here: [https://indico.cern.ch/event/760347/contributions/3154185/attachments/1724067/2819015/LIU-BP-PS\\_KFA14.pdf](https://indico.cern.ch/event/760347/contributions/3154185/attachments/1724067/2819015/LIU-BP-PS_KFA14.pdf) ). Basically, the method followed is to adjust the KFA14 fine delay and record the beam movement in 4 different downstream detectors. 1000's of measurements were taken for better resolution for each waveform. A modified LHCINDIV cycle was used with a bunch rotation before extraction to create a short bunch allowing fine resolution measurements of the kicker's waveform.

In slide #6, two different data sets are visible on measurements with the BPM at 700 ns fine delay in which the spread is due to the two different lines, caused by hysteresis effects in the machine and transfer line. The difference in the waveform of BT3.KFA14L1, may stem from the kicker pulsing more than the other kickers and even might be due to a bad contact somewhere. This will be discussed with the equipment group.

As a conclusion, emittance blow-up varies between 0.5 to 2.5% along the kicker pulse. The flatter, early side of the waveform should be synchronized with the LHC beams to minimise the emittance growth and to keep it below 1%.

Alexander asked if there were any changes foreseen after LS2 the kickers? Matthew replied that the LIU spare kicker magnets might be installed if they are ready in time, but that this was not needed for LIU performance to be reached; only optimisation of the kicker fine delay will need to be checked.

Heiko commented that the situation was excellent for the PSB extraction kicker KFA14, as well as for the injection kicker KFA45, both small contributors for the important emittance blow-up. He asked if they should be taken out of the consideration for observed emittance blow? Matthew confirmed that indeed the horizontal emittance blow does seem to be caused by either of the kickers. Also the recombination kickers can be excluded. They provide a vertical kick and measurements have shown that they have virtually no effect on the horizontal emittance, as expected. However, the dispersion mismatch is still on the table as the main source of emittance blow-up along with the systematic errors. It is still not clear if the observed emittance blow-up is real.



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## 2. AOB

Possible topics for the upcoming meetings were discussed:

- Salim to present a follow-up regarding further analysis of the turn-by-turn data after injection.
- Energy of the intermediate plateau for RF manipulations after LS2 to be defined.

Measurements with the new prototype wire scanner and related algorithms for analysis should be discussed. Especially, the algorithms to extract the beam size from the photo-multiplier seem to affect the results. The beam size measured by the new wire scanner was reported to vary by 15% depending on the treatment of the raw data.

*Minutes by [A. Lasheen](#) and [S. Oqur](#)*