The round table

- Original questions and new questions

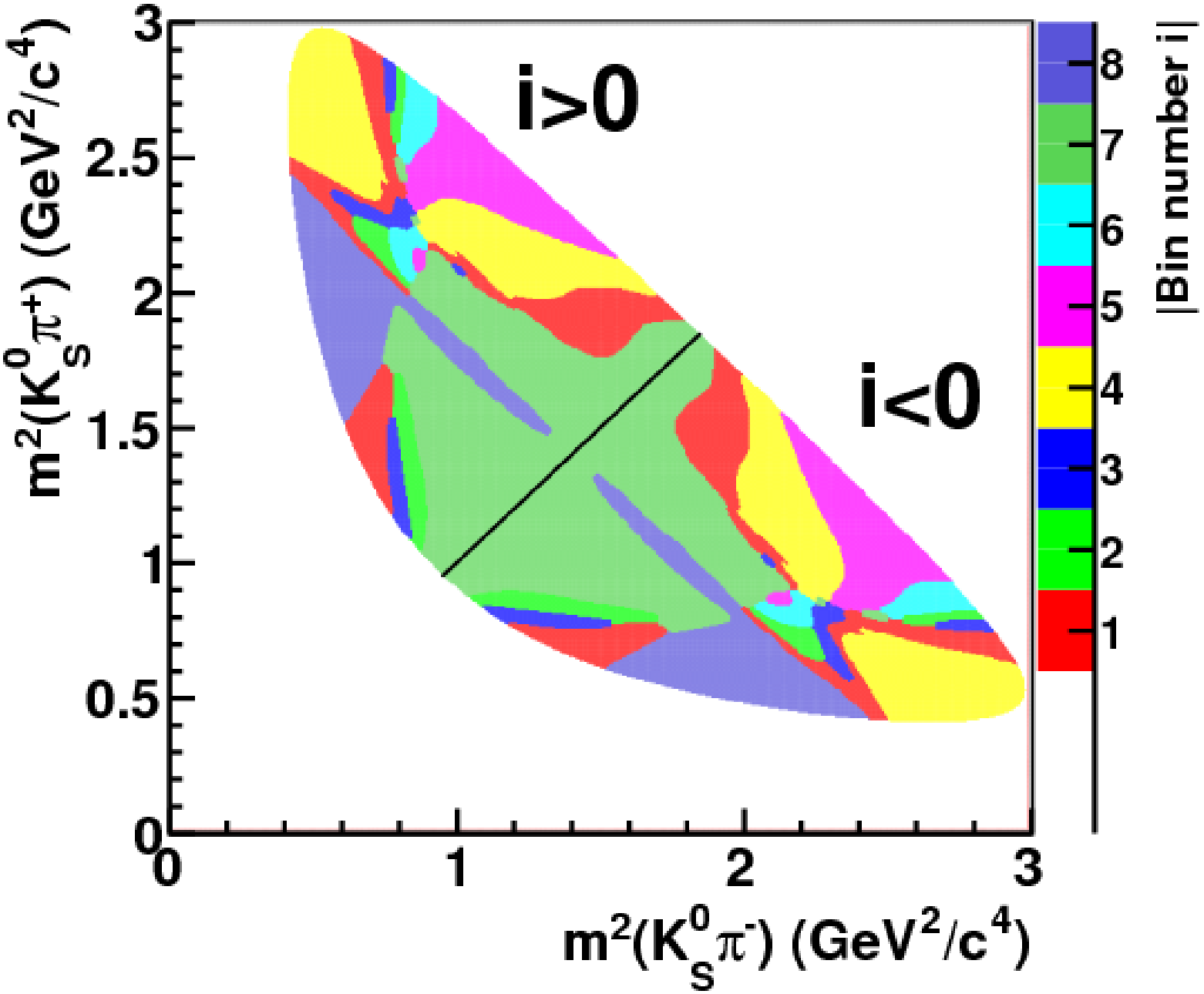
Accelerator original questions

- Is a symmetric machine a strong limitation?
  - For charm CPV use Dalitz plot correlations (Bondar)
    - To be checked with appropriate MC
    - A taken decision
  - A possible asset by inverting beam charge?

competition

Parameter	$\Psi(3770)$	$\Psi(4040)$	LHCb	Belle-II
$x(\%)$	0.02-0.05	0.03	0.015	0.08
$y(\%)$	0.02-0.03	0.03	0.010	0.04
$\|q/p\|(\%)$	2-5	0.9	1	5
$\arg(q/p)(^\circ)$	2-3	0.8	3	2.6

Uniform efficiency over the dalitz plot...(?)



Accelerator original questions

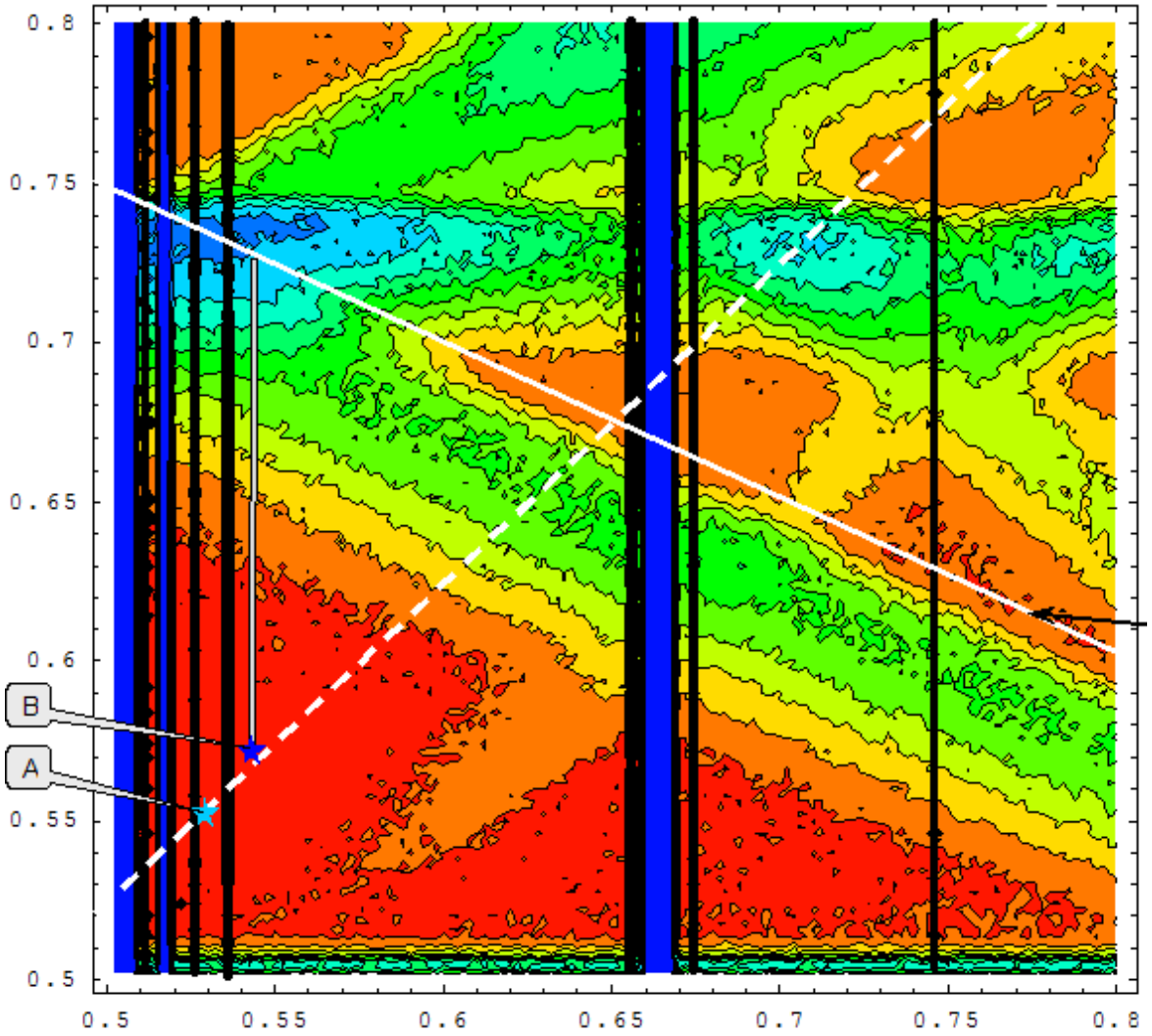
- Is the polarization still an asset?
  - Polarized beams allow to be sensitive to tau polarization
  - Triple product for tau production involve tau's low momentum…
  - Tau spin may be used for correlations with decay products
  - Polarization as an asset to decrease background and enhance the signal yield. MC needed
  - Relevant for "difficult" tau decays

⇒ single energy

Accelerator original questions

- Is the quoted luminosity value confortable?
  - Two independent lattice design with similar ring's length came to the same conclusion

Luminosity tune scan



CW advantage:

- BB coupling resonances are suppressed
- Wide red area corresponds to 10^{35} $cm^{-2}s^{-1}$

Accelerator original questions

- Are there critical issues that require some further studies?
  - Final focus design and background
  - Polarization implementation
- Is the coexistence with an X-FEL operation mode pacific?
  - NOT discussed
- Is the luminosity at low energy competitive?
  - To be explored

Accelerator additional question

- Is the cost “projection” realistic ?
  - IT tau charm points to a bare cost below 190
  - BINP layout is valued similarly
- Enough to proceed to engineered components evaluation

Very preliminary cost

Item	800 m 2.5 GeV M€	400 m 2.1 GeV M€
•Detector	100	100
•Collider	250	100 (1/2, less spin rot. and damping wig.)
•Linac	40	30
•Pol.e source	1	1
•Building, tunnels, engineering, etc.	50	10 (renovation of equipment)
Civil engineering (IT)		35
•TOTAL	441	241 (141 + 35)

Physics original questions

- Are there unique discovery physics cases?
  - Mainly on CPV and Flavor violation
  - Lepton universality to be better explored
  - Accessible NP scales to be investigated systematically
- Is there an ideal window of opportunity?
- What is the progress achievable on “standard measurements” for example in charm decays and charmonium states?

Late evening estimates of NP scale reach

- Ingredients
  - Dimension six operators with a scale LAMBDA
  - Heff=$\sum$i(1/Λ^2) O_6
  - Dimensional analysis for Sigma and assuming 100 “rare” events (before cuts…) or BR of the order of 10^-9

  - Production, four fermions: 4-6 TeV
  - Production, two fermions: 25 TeV
  - Branching ratios 10^-9 in decays, four fermions: 30 TeV
  - Branching ratios 10^-9 in decays, two fermions: 300 TeV

  (units h=c=1=…2pi..)

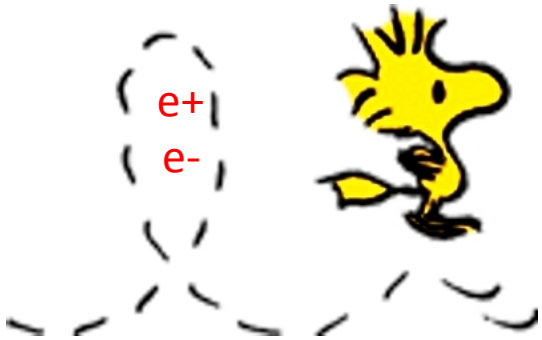
- Interference effects gives much higher limits but need more data

Luminosity and threshold production

- Luminosity wins for the number of events
- Threshold conditions may strongly reduce background (phase space and PID of neutrals)
  - MC needed
  - …. Detector needed…

Physics original questions

- Is there an ideal window of opportunity?
  - Probably before possible SuperkekB upgrade (25 ??)
  - … but also tau charm may get an upgrade…
- What is the progress achievable on "standard measurements" for example in charm decays and charmonium states?
  - PANDA energy resolution on charmonium in p-pbar mode cannot be challenged.
  - Gamma gamma may provide non 1- states
  - Definite QCD progress (alfa, fragmentation functions, Passemar's talk)



τCHEAP

(/ttʃiːp/) or (tch ēp)

Tau CHarm European Accelerator Project

τCHEAT

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Tau CHarm European Accelerator Trap