



Regional Flavour Factories followed by ECFA

“One of the ECFA roles is an incubator for new ideas helping them to grow to the next stage”

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- Recent ECFA activities on flavour physics
 - Review on the INFN Super B Factory project March 2008 to November 2008 by RECFA working group. Report endorsed by PECFA 27-29.11.2008
 - Presentation on tau-charm factory projects by Novosibirsk (BINP) and Turkey to PECFA 26-27.11.2010. Progress to be followed.
 - Presentation of tau-charm factory project by BINP to RECFA 12.3.2011. RECFA recognised the physics case for a tau-charm factory, and saw that its scale was a national project. This has been communicated to BINP

- Conclusions of the 2008 studies

Physics III

- By 2015, LHCb will explore 10 fb^{-1} of data. **A step beyond the “LHCb” era for an e^+e^- machine requires >50 time more statistics** than now to unambiguously establish any effects of beyond the Standard Model for those, which exhibit no sign now, or which may appear in a couple of years at LHCb (more “inclusive” $\Delta B=1$ $b \rightarrow s$ and $b \rightarrow d$ studies may become important?).
- LFV, e.g. $\tau \rightarrow e\gamma$ would be a big issue. (interesting to see what $\mu \rightarrow e\gamma$ will say in coming years)

- Conclusions of the 2008 studies

Physics III

- The main goal of PEB-II and KEKB was a quantitative test of the KM mechanism of CP violation from the $B_d \rightarrow J/\psi K_S$ decays.
⇒ CKM parameters were known enough to make a good prediction for the required luminosity at the time of their construction.
- For a SuperB project, there is **no “success guaranteed” minimum luminosity**, since we don't know the New Physics parameters.
⇒ **But this is the case for the most of the high energy frontier accelerators too.**



- Conclusions of the 2008 studies

Conclusions I

- Flavour physics is an important part of the European particle physics programme. Rich physics programme.
 - European Strategy Document already recognises a flavour physics facility as a national or regional activity-
- An e^+e^- collider at Y(4S) energy region would be a significant milestone if
 - much more than 50 ab^{-1} data by the end of ~ 2020
 - moderate cost

- Conclusions of the 2008 studies

Conclusions II

- INFN Project addresses these points by
 - Very high luminosity $>10^{36}$ with a unique machine concept
 - Reutilizing PEP-II and BaBar parts
- Machine R&D for the TDR should be **strongly supported** to show that the concept can be realised. (R&D is also useful for the future machines. Continue collaboration with KEK?)
- Still large amount of work needed for the TDR and a **strong team** of machine physicists and engineers **centrally located** should be formed very soon.

- Conclusions of the 2008 studies

Conclusions III

- A strong team of experienced machine physicists should be prepared for the operation to achieve the required performance.
- For considering an approval, there should be
 - a clear plan containing realistic technical milestones
 - a description of required resources and concrete strategy how to obtain them

with a goal to achieve much more than 50 ab^{-1} data by ~ 2020 to make a meaningful impact. **If much later than this, physics landscape could be drastically different.**



- Two new inputs since then
 - SuperKEKB changed its design from a high current scheme to the INFN scheme using small emittance beams, and its construction has started
 - LHCb has started to take data delivering expected performance, i.e. substantial achievement could be expected from LHCb before SuperB factories start data taking



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- Final remarks

- ECFA believes that the previous conclusions remain valid and hope that issues given there will be addressed in appropriate time
- Even the INFN SuperB machine is a “national project”, its fate has an impact on the European particle physics. This could be a relevant issue for the Strategy Session of CERN Council.



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- RECFA Remarks made for Novosibirsk tau-charm factory
 - High precision tau and charm physics
 - important in itself
 - provide crucial information for the interpretation of measurements by the flavour physics experiments at the LHC and the Super B Factories
 - Unique advantage of working at the tau/charm threshold
 - Such a machine could be built as a national project and BINP has necessary expertise