Summary Report on the Tau-Charm Physics Workshop

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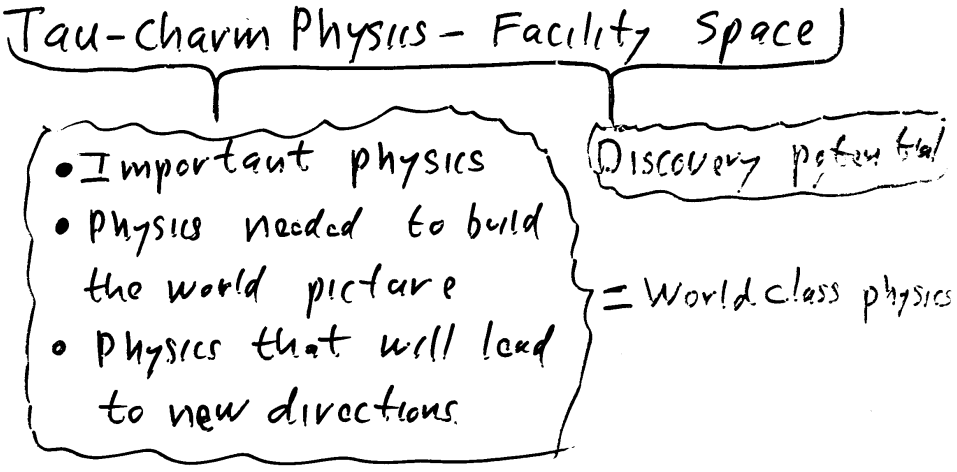
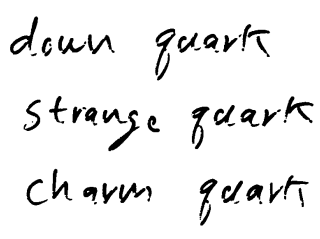
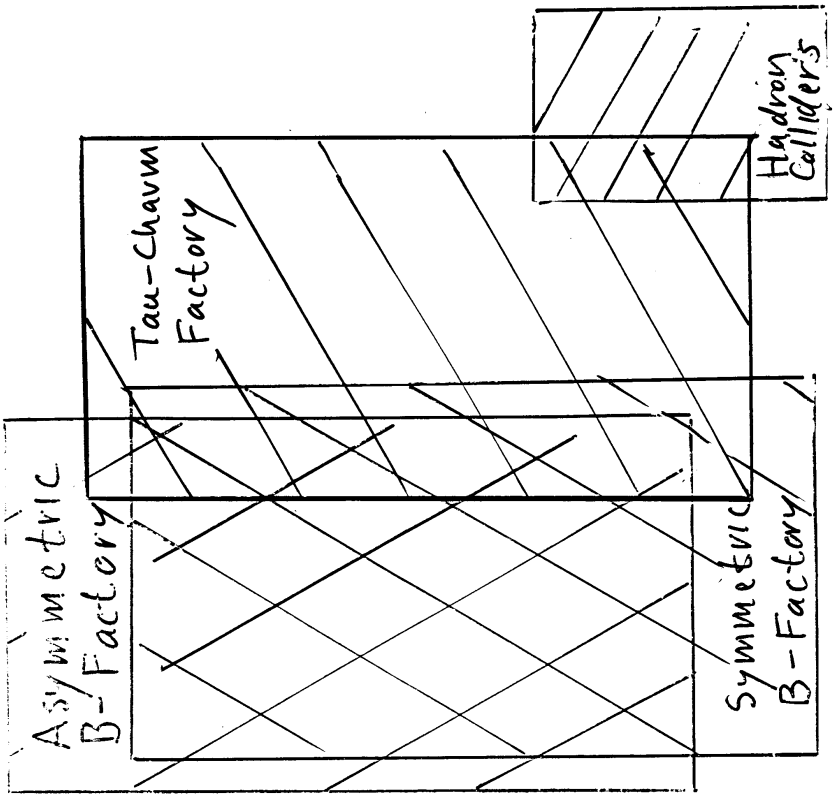
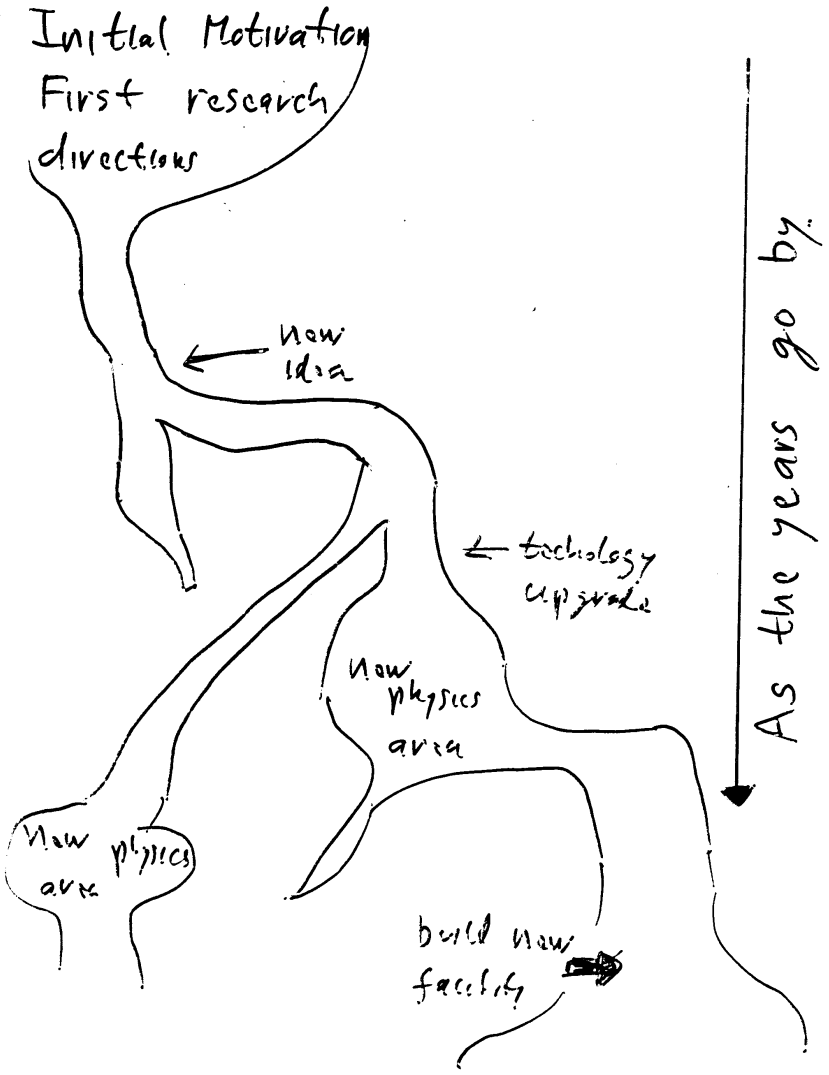


- ☐ Requires TCF
- ☐ Best done with TCF
- ☐ Can be done at TCF or BF
- ☐ Best done with BF

The Tau-Charm Factory is a facility for research on the tau-quark-gluon elementary particles




Asymmetric
B-Factory
Tau-Charm
Factory
Symmetric
B-Factory
Hadron
Colliders


Initial Motivation
First research directions
new idea
technology upgrade
new physics area
new area physics
build new facility
As the years go by

Physics Requires TCF

→ Physics coming from J/ψ and ψ', in particular the great question of GLUEBALL reality

→ Steady improvement of precision of some τ physics studies:
leptonic modes
ν_τ mass, τ mass

→ Radiative τ decays
Substantial progress in D^0-$\bar{D}^0$ Mixing measurements

→ Check that hadronic background is not source of unusual τ behavior

More requires TCF

→ R ($e^+e^- \to$ hadrons) at low energy with precision, tests of QCD,

Physics Best Done With TCF

With polarized beam

$\tau \to \mu\gamma$ and other forbidden decays

Use polarized beam to search for new physics in τ decay

Some D and D_s decays

Study of low mass mesons using 2 virtual-photon channel

Study of QCD in low mass mesons and baryons

Physics That Can Be Done with TCF or BF

Some types of searches for CP violation in τ decay with or without polarization

D and D_s decays in some cases

Further studies of CP violation in $e^+e^- \to \tau^+\tau^-$

Physics Best Done at BF

Study of semi-hadronic decays of τ

Known method for studying CP violation in τ decay

Building the collider

$\mathcal{L}_{TCF} = 10^{33}$ can be done

$\mathcal{L}_{TCF}$ can follow $\mathcal{L}_{BF/2or3}$

Stimulating technology

Building the detector

May be only advanced detector to be built

Stimulating R&D

Stimulating technology