Work for Tutorial 19th Feb

Parameters
Send latest lattice, magnet and synchrotron radiation parameters for the FCC (hadrons) to Riccardo with the intention of calculating thermal loading of the beam tube for 40mm and 30 mm bore cases.

Investigate physics limitations of an FCC hadron collider of lower energy (30 TeV per beam) or lower luminosity (factor 4 smaller). Emmanuel has a reference for this. Write a para or two on your conclusions.

Find out what you can about the consequence of a smaller bore diameter (30mm) on the beam shield diameter and the rise time of the transverse multi-bunch instability (see figure in Contribution of Daniel Schulte to the FCC Kick-off Meeting which I included in my second lecture on Instabilities. Write a paragraph summarising your conclusions.

RF
What are the relative merits of modelling the superconducting cavities on LEP LCH or Linear Collider frequency choices (such as aperture bore instabilities etc. I will send some guidance on instabilities). For the moment center your parameter optimisation on the LHC cavity design.

Clarify the slides shown last week on ellipse and dome optimisation showing the physical shape for some of the curves.

Lattice
Update table of alternatives to compare cases with the same field at the edge of the quadrupole bore (20 and 15 mm radius). Adjust quadrupole lengths accordingly. Adjust the magnet length to fill the space available for the same field (Say 14T for niobium tin and 9T for Niobium titanium (ask the Magnet group for the values they have fixed for these two fields.

Write a para to explain how you scale the lattice parameters for the two bore diameters (30 and 40 mm).

Magnets
Keep four alternatives (niobium tin or niobium titanium permuted with 30 and 40 mm bore).

Explain carefully how you arrive at the jurrent density for each design.

Try to avoid concentric empty spaces between coils (constraining the forces may be difficult) if necessary ask Neil Marks.
Cost the various alternatives using todays cost of superconductor – check with Neil.