Trouble with TWISS!

- Various problems have been found during CLIC related studies.
- Rigorous testing in the example checking for the next LHC production version has revealed more bugs.
- **Main Issues:**
  - Threader missing for Lines
  - Synchrotron motion always closed solution
  - Various inconsistencies with chromatic functions (dispersion, derivative of dispersion…)
  - **Relevant for LHC:** Chromaticity wrong when motion is coupled
  - Chromatic functions Wy, phiy could not be initialized

Present Situation

- Quoted Issues have been fixed as far as technical possible.
- For instance: It is **NOT** possible to introduce the coupling into the present implementation ➔ solution: determine numerically running TWISS twice on & off momentum.
- By nature of the implementation chromatic functions may still be wrong.
- This is as far it goes for TWISS ➔ code frozen except for obvious bug fixes.
- Since we have ptc_twiss which *by nature of its implementation must be consistent* black-box usage of MAD-X is no longer advisable.
- Jean-Luc will make an effort that ptc_twiss will have all **TWISS** features plus desirable ones, e.g. TWISS parameters are now calculated within the element (chromatically correct of course)!
- The price to pay for proper results with ptc_twiss is a hefty increase of computation time.

Example Checking!

Please correct your MAD-X examples!

We cannot release the next production

4.00.XX

Unless all Examples have been rigorously checked!!!