

# SPS Optics Model - with A. Faus-Golfe & G. Arduini

- measurements with 48-bunch during lead-ion run, October 18–20, 2000: chromaticity, detuning with amplitude; →slides
- fitting procedure:
  - (1) tunes: 0.6162, 0.5924; fitted by  $\Delta KQF1.F = -0.0037\%$ ,  
 $\Delta KQD.F = 0.029\%$ .
  - (2) linear chromaticity:  $Q'_x = 1.788$ ,  $Q'_y = 0.2$ ; fitted by, e.g.,  
A) matching  $b_3$  components in *MBB* and *MBA*:  
 $b_3 = 1.37 \times 10^{-3} \text{ m}^{-2}$  (*MBA*),  $b_3 = -0.83 \times 10^{-3} \text{ m}^{-2}$  (*MBB*)  
B) rematching the 4 sextupole families w/o  $b_3$ :  
 $\Delta KSDA.F = 3.1\%$ ,  $\Delta KSDB.F = 2.8\%$ ,  
 $\Delta KSFA.F = -3.5\%$ ,  $\Delta KSFB.F = 28.1\%$ .
  - (3) 2nd order chromaticity; fit  $b_4$  in quadrupoles
  - (4) 3rd order chromaticity; fit decapolar component  $b_5$  in dipoles  
 $b_5(\text{MBA}) \approx b_5(\text{MBB}) \approx -8.5 \text{ m}^{-4}$ .

- compare detuning with amplitude →slides; **inconsistent result** (octupoles stronger than predicted)
- remark: **pronounced 3rd order chromaticity** was less evident in 1978 studies (CERN SPS/AOP/78-9).

### 2001 SPS Optics MD Proposals:

- **nonlinear chromaticity vs. (reduced)  $\Delta\xi$**
- measure **tune vs. dipole field** with constant orbit (→natural chromaticity)
- measure **1000-turn phase advance** for different radial steering to **localize sextupole fields** (K. Cornelis)
- **detuning with amplitude** incl. cross plane (kicker calibration)

### Complementary Measurements for Transv. Impedance Studies:

- **head-tail monitor, TMCI** threshold ( $\Delta Q \sim 5Q_s$ )