



PROPOSAL: UPDATED STAR SENSOR FABRICATION PLAN

- Improve PHASE-1 design \rightsquigarrow PHASE-2
- Improve radiation tolerance of ULTIMATE \rightsquigarrow 2 consecutive versions



■ Updates w.r.t. PHASE-1 :

- discriminator threshold distribution alleviation by design optimisation of switch transistor (reduce size) and of buses steering thresholds
- possibility of external setting of discri. threshold (testability)
 - ↳ reduced nb of mask modifications
 - ⇒ New submission costs \sim 15 kE for masks (IPHC) + 23 kE for 6 wafers

■ Dates :

- submission in Autumn 2009
- back from foundry \leq end of 2009



■ AMS-0.35: undepleted epitaxial layer

↪ non-ionising radiation tolerance $\gtrsim 2 \cdot 10^{12} n_{eq}/\text{cm}^2$ & $\sigma_{sp} < 4 \mu\text{m}$

■ Adapt MIMOSA-26 design:

- nb of raws : 576 \rightsquigarrow 1024
- output memories: 200 \rightsquigarrow 500 hits/frame
- improved ionising radiation tolerance (results from MIMOSA-22bis & -ter)
- should the number of sub-arrays be increased to 6 or 8 ?

■ Correct imperfections of MIMOSA-26 design:

- increase nb of sub-arrays against discriminator threshold dispersion
- possibility of external setting of discriminator threshold (testability)
- etc.

■ Schedule & cost:

- submission \leq mid-February 2010 \Rightarrow back from foundry $<$ end of April 2010
- cost \sim 100 kE (2 wafers) + 4 kE/wafer



■ Improve ULTIMATE-1 design:

- XFAB-0.35: depleted epitaxial layer (IF validated by 2009 engineering run)

↪ non-ionising radiation tolerance \gtrsim several $10^{13} n_{eq}/\text{cm}^2$ & $\sigma_{sp} \lesssim 5 \mu\text{m}$

- Incorporate latch-up free memories (to be designed in 2009)

■ Schedule & cost:

- submission \sim Autumn 2010 \Rightarrow back from foundry \sim 2010/11 turnover

- cost \sim 60 kE (2 wafers) + 4 kE/wafer (???)



- MIMOSA-22ter : improve ionising radiation tolerance of pixel design
 - ↳ submitted end of May \Rightarrow rad. tol. tests in Autumn

- Design latch-up free memories
 - ↳ part of XFAB-0.35/PIN engineering run in Autumn ?

- Translate MIMOSA-22 to XFAB-0.35
 - ↳ XFAB-0.35/PIN run in Autumn

- Explore XFAB-0.35/PIN (depleted epitaxial layer), IF already available in 2009

- Several other projects :
 - Sensor devt: 3D chips, IBM-90, space dosimeters (pixels with ADC), EB-CMOS camera
 - System integration studies (ladders): double-sided 0.3 % X0 ladder (PLUME project), thin-film wrapped ladder (EU-FP7 project HadronPhysics-2/ULISI)
 - Exploiting MIMOSA-26 for various telescopes



- XFAB-0.18 exploration ?

- Head-to-head fast sensors in XFAB-0.35 (derived from MIMOSA-26)

- IBM-90 characterisation

- 3D run ???

- Continuation of PLUME and ULISI projects