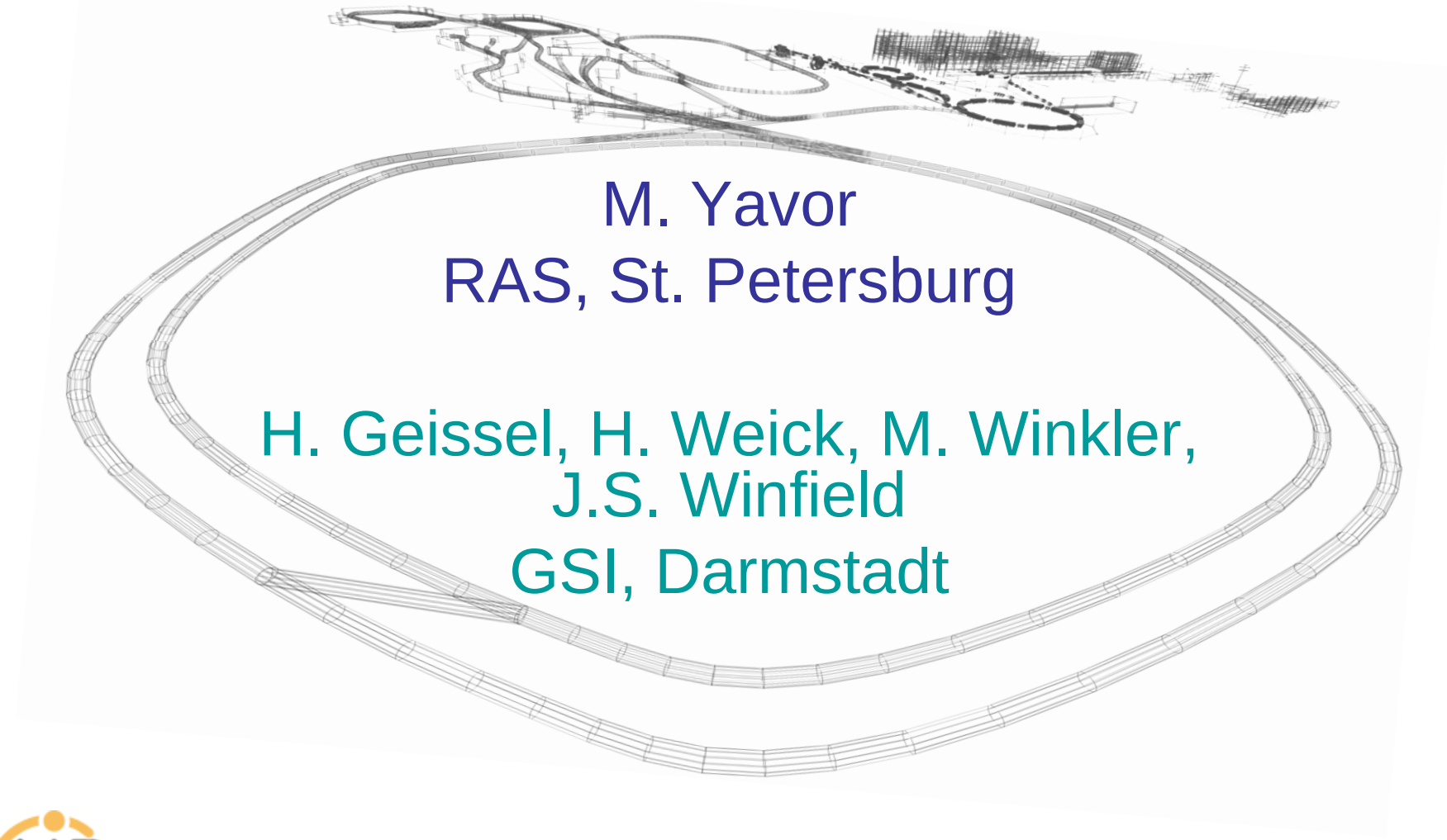
Super-FRS Lattice with Cos θ multiplets



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Motivation

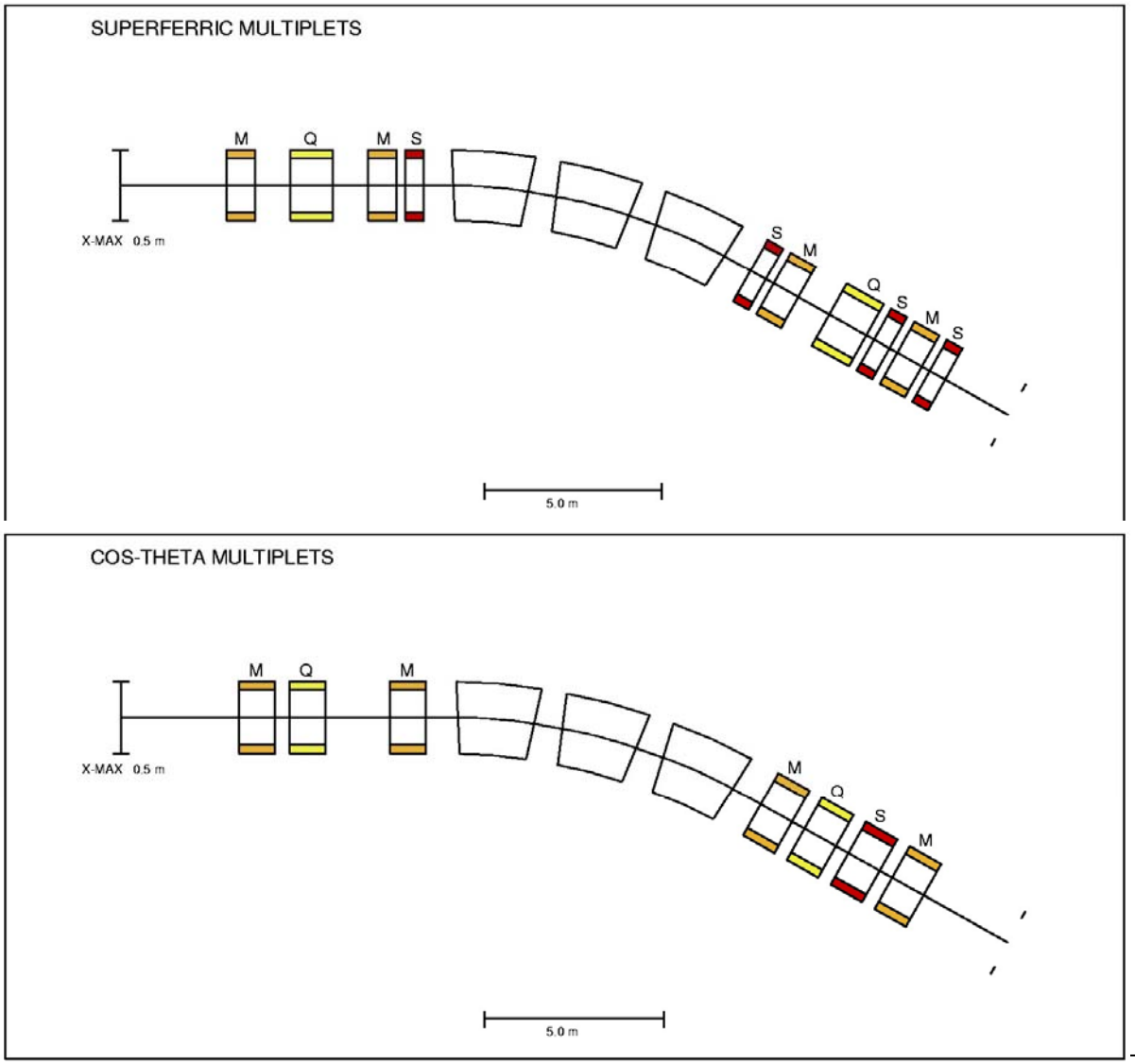
- Super-FRS TDR considers superferric multiplets.
- If we were to adopt cos-theta type magnets for the Super-FRS, we would want to make use of possibility of putting sextupole correction coils together with quadrupole and octupole components.
- Cos-theta magnets can also provide somewhat higher field gradients with little additional overhead compared to superferric quadrupole magnets.

=> new lattice study by M. Yavor

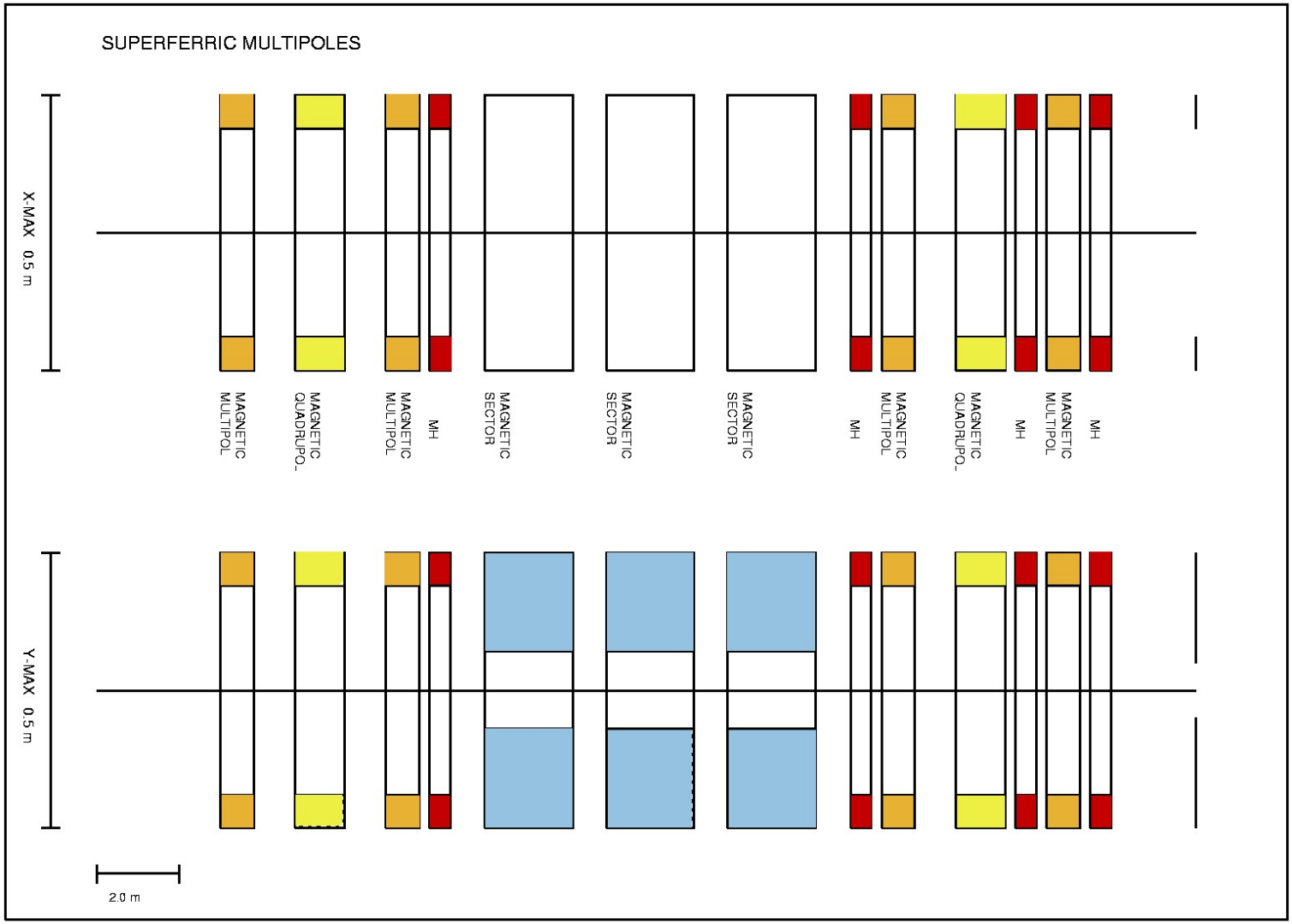
Procedure adopted

- Transmission optimized for +/-8 mm height at target (y-direction).
- For fission fragments ^{134}Sn transmission estimated by Mocadi simulation as 35% to 38% for all branches.
- Included additional 3rd-order correction at the ends of Pre- and Main-separators [correction of (x,ayy)].
- To improve separation quality, in Pre-separator used 6-sextupole correction scheme instead of 5-sextupole one adopted before. (Not necessary for small initial beam heights.)
- All additional corrections are performed by coils located inside existing quadrupoles.

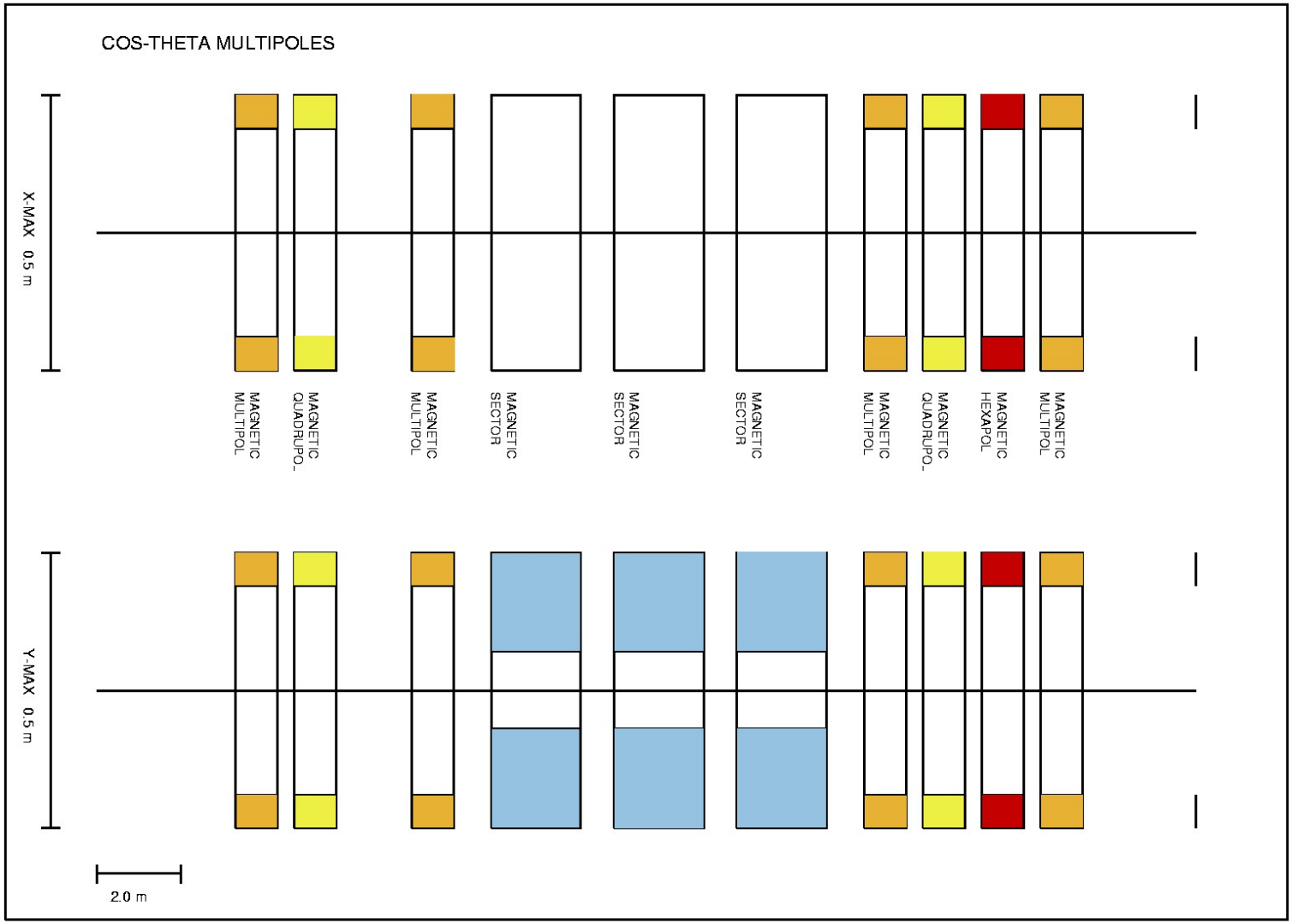
Comparison of lattices



Superferric lattice (one section)



Cos-θ lattice (one section)



Cos-θ magnets used in lattice

- 1.0-m effective length
- 0.19-m useable aperture (circular)
- Quadrupole, sextupole and octupole components possible
- Pure quadrupole and pure sextupole included
- Spacing between multipoles: 0.4 m
- Spacing multipole – dipole: 0.9 m
- Maximum quadrupole field gradient 12.1 T/m