44-88 MHz transverse optics for the rotation section
**Finding Twiss parameters**

- ICOOL provides particles position and momentum for a given $z$.
- Choose 8 particles with 0.1 cm or 1 MeV/c deviation.
- Compute the transfer map for each plane (cf. Scott's algorithm).
- Transfer map $R$ of a lattice made with solenoids only is a function of the phase advance $\phi$ and solenoid strength $S(e,B,p)$.
- At the end of the solenoid coil:

$$R = \begin{pmatrix}
\cos^2(\phi) & \sin(2\cdot\phi)/S & \sin(2\cdot\phi)/2 & 2\cdot\sin^2(\phi)/S \\
-S\cdot\sin(2\cdot\phi)/4 & \cos^2(\phi) & -S\cdot\sin^2(\phi)/2 & \sin(2\cdot\phi)/2 \\
-\sin(2\cdot\phi)/2 & -2\cdot\sin^2(\phi)/S & \cos^2(\phi) & \sin(2\cdot\phi)/S \\
S\cdot\sin^2(\phi)/2 & -\sin(2\cdot\phi)/2 & -S\cdot\sin(2\cdot\phi)/4 & \cos^2(\phi)
\end{pmatrix}$$

$$S = 0.299\cdot B[T]/p[GeV/c]$$

$$\phi = S\cdot z/2$$
**SOL model 1 (1/2)**

- Constant 1.8 T field in central region + linear ends.
- At the coil ends $B_z = 0$ and $dB_z/dz$ non-zero.
Identify the transfer map elements to the Twiss parameters for a periodic lattice.

Algorithm working fine.
**SHEET model 4**

- Continuous 1.8 T field in the rotation section.
- At the coil ends $B_z \neq 0$ and $dBz/dz \sim 0$.

Particles with no momentum deviation don't change transverse position.

Particle with no momentum deviation don't change momentum.

**SHEET model 4: no x-y coupling?**
Algorithm does not work in this case.
Conclusion (to do)

- SHEET model 4: particles not rotating in 1.8 T continuous field (does it make sense?).

- Use another algorithm to compute the transverse map with SHEET model 4?

- Use another code (G4MICE, PATH)?

- Look at other parameters of the rotation channel (energy spread, rotation performance).