

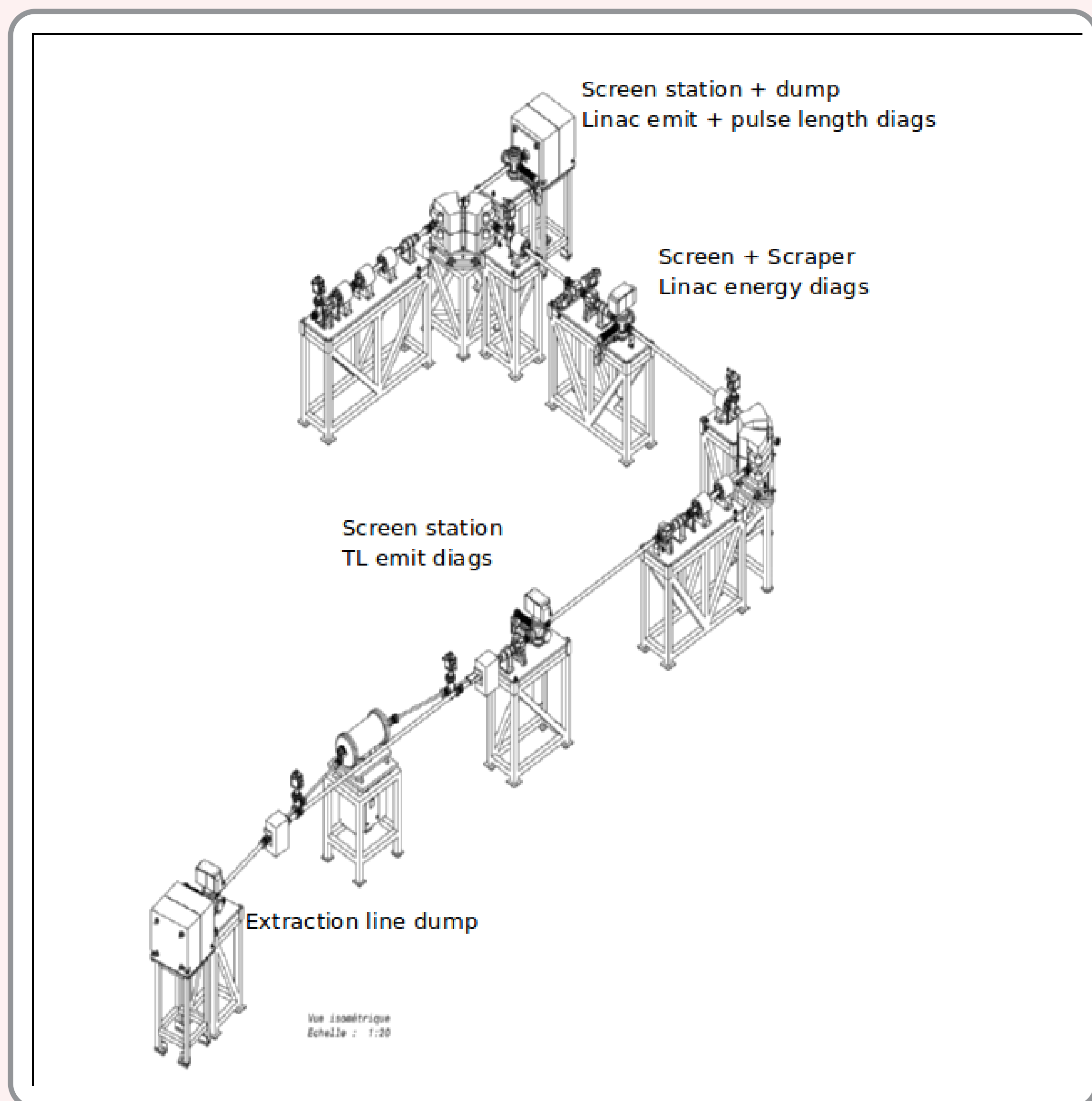
High Level Control Command for Transfer Line

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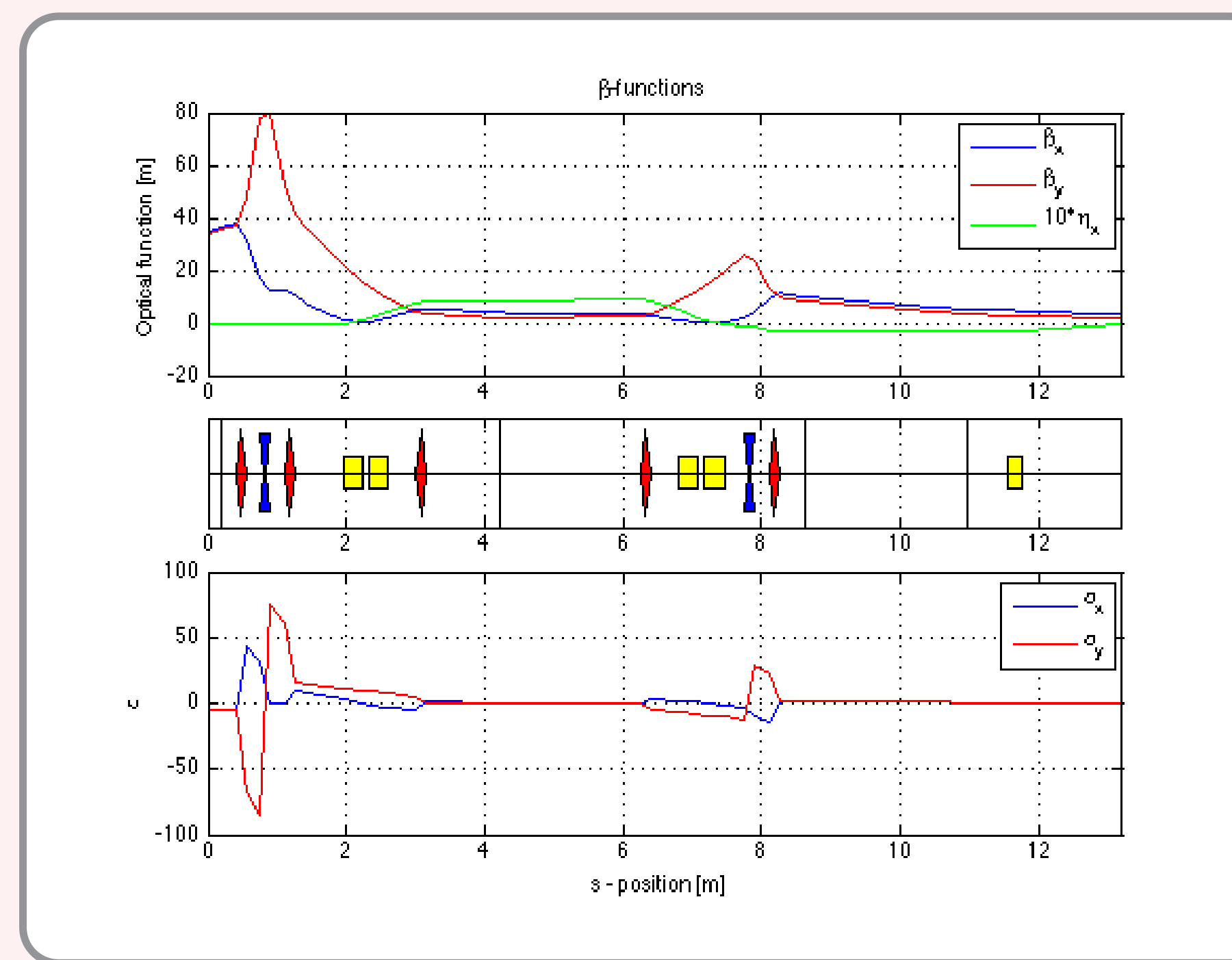
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ThomX Transfer Line



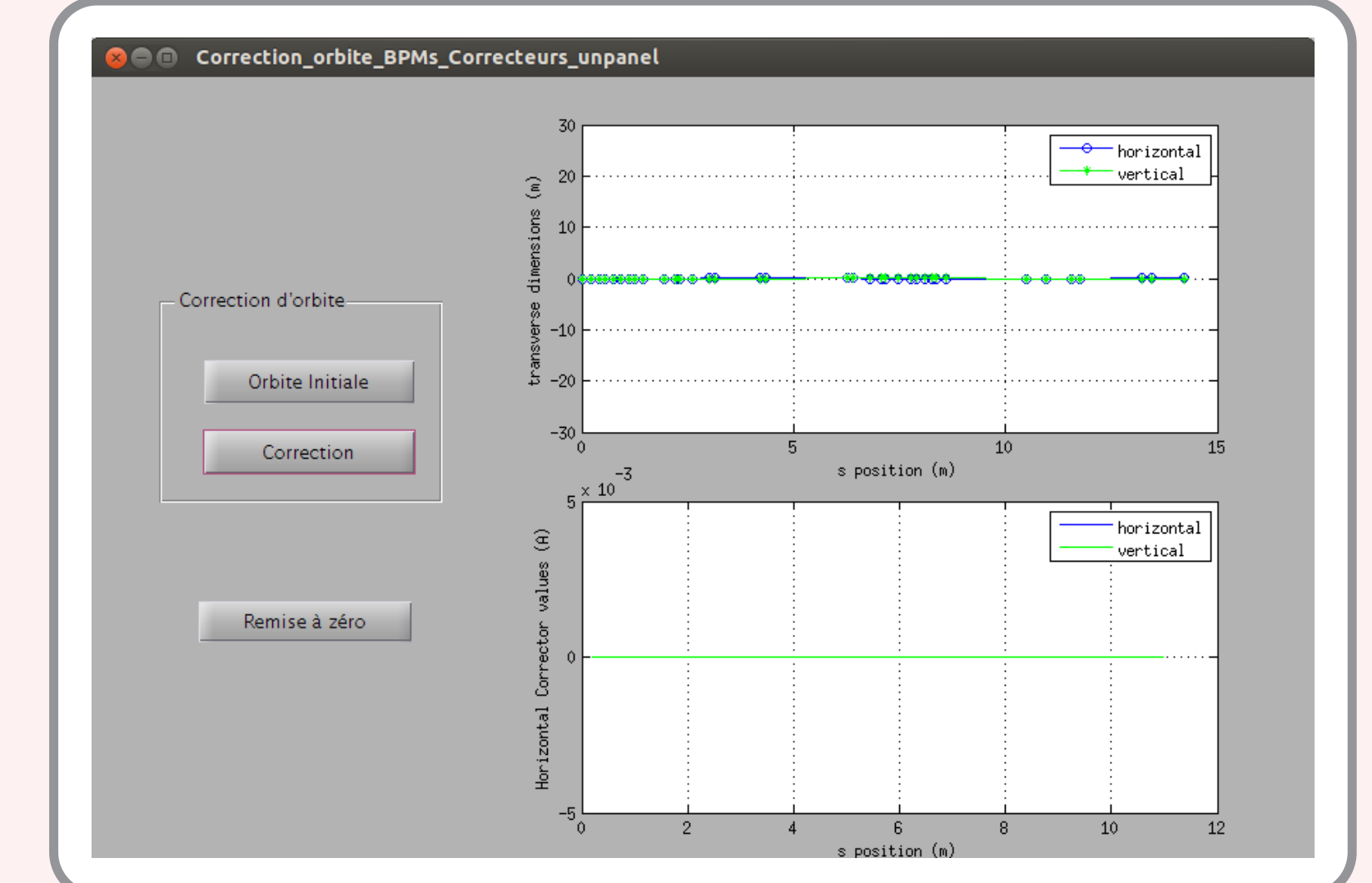
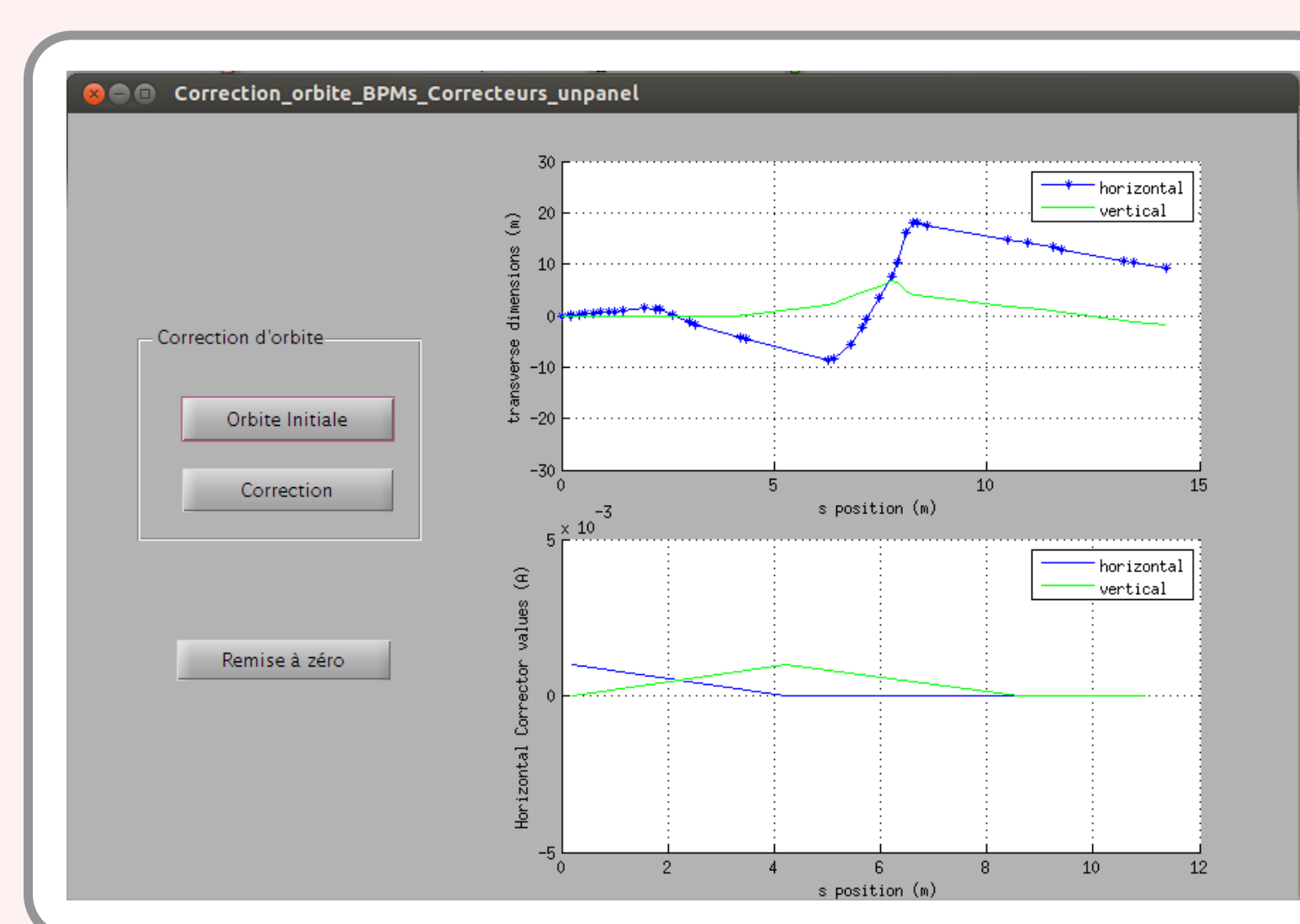
- The transfer line has to transport the beam from the linac to the ring and to match the optics of these two devices. It also includes beam diagnostics as BPM, ICT and phosphorescent screens
- Due to the limited storage time \rightarrow damping time is negligible during the storage cycle
- The Transfer line has to be designed to minimize beta function error or orbit error at injection, which can induce emittance growth

Matlab Middle Layer/Accelerator Toolbox \rightarrow Tango



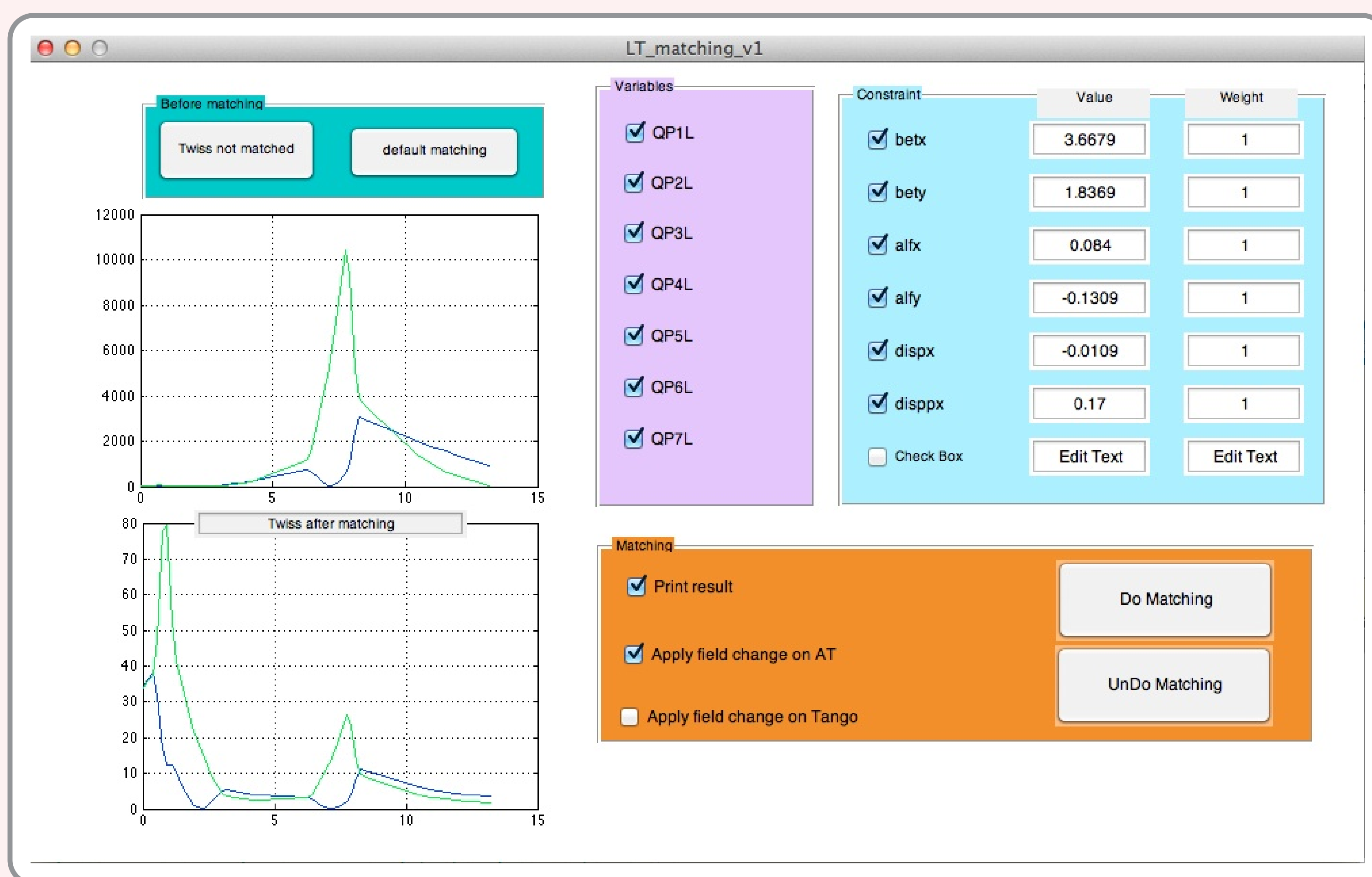
- Particular structures have been created for the emittance measurement (straight line of the transfer line) and the orbit correction (use an additional corrector on the storage ring)
- This line has 7 quadrupoles, 4 dipoles et 1 short dipole before injection in the ring, 8 BPMs (4 horizontal and 4 vertical), 5 horizontal (HCOR) and vertical (VCOR) correctors

Orbit correction



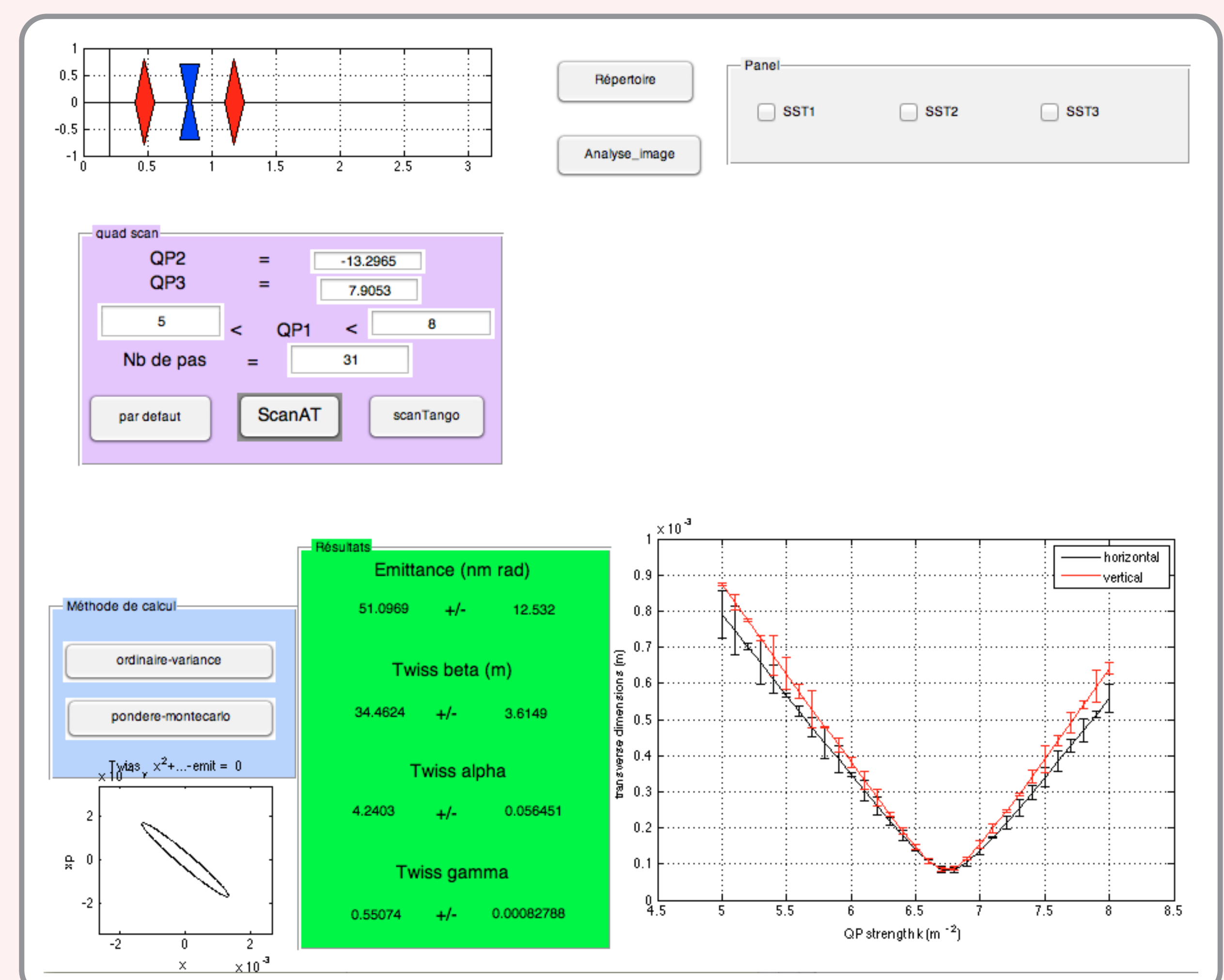
- 1 mA error introduced in the first horizontal corrector and in the second vertical one
- Use of the BPM response matrix combined with a Single Value Decomposition (SVD) method
- Correction applied in AT (Accelerator Toolbox)

Matching



- Matching the twiss parameter at the linac exit to the ring entrance with the transfer line quadrupoles
- Minimization algorithm
- Possibility to reverse matching, link with AT or Tango

Emittance - 3 gradient quad scan



- 3 gradient scan thanks to the triplet placed after the linac section
- Double waist on the screen station adjusted thanks to the matching panel
- Image data extraction already written \rightarrow tango expected
- Twiss parameter reconstruction with least mean square method \rightarrow tested with AT

Conclusion

- First tests validated with AT model
- Waiting on the real machine tests with Tango
- Transfer line commissioning expected in 2017