

Future plans for ultra-low β^* in ATF2

Marcin Patecki^{1,2},

**A. Aloev¹, D. Bett¹, K. Kubo^{4,5}, S. Kuroda^{4,5}, E. Marin³, M. Modena¹,
T. Okugi^{4,5}, F. Plassard^{1,6}, T. Tauchi^{4,5}, N. Terunuma^{4,5}, R. Tomás¹,
G. White³**

¹ CERN, The European Organization for Nuclear Research , Geneva, Switzerland.

² Warsaw University of Technology, Faculty of Physics, Poland.

³ SLAC, National Accelerator Laboratory, California, USA.

⁴ KEK, High Energy Accelerator Research Organization, Tsukuba, Japan.

⁵ SOKENDAI, School of High Energy Accelerator Science, Hayama, Japan.

⁶ LAL, Universite de Paris-Sud, Orsay, France.

Conceptual work is well advanced

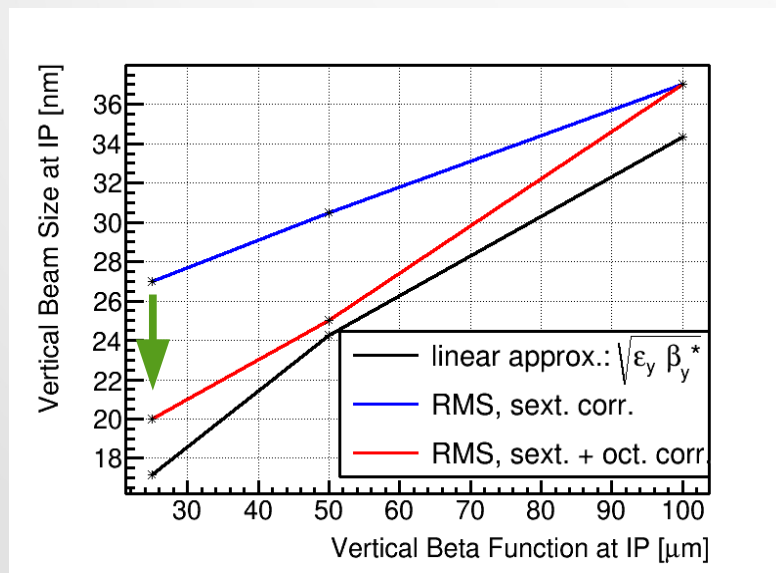
- D. Angal-Kalinin, S. Bai, P. Bambade, H. Braun, J.P. Delahaye, et al., **Exploring ultra-low beta* values in ATF2 – R&D Programme proposal**, 2008, pp.1-6. <in2p3-00308662>.
- E. Marin et al., **Design and high order optimization of the Accelerator Test Facility lattices**, Phys. Rev. St. Accel. Beams 17, 021002, 2014
- M. Patecki, R. Tomás, **Effects of quadrupole fringe fields in final focus systems for linear colliders**, Phys. Rev. St. Accel. Beams 17, 101002 (2014)
- E. Marin et al., **Specifications of the octupole magnets required for the ATF2 ultra-low β lattice**, SLAC Technical Note: SLAC-TN-14-019.
- M. Modena, **Update on 2 Octupoles Procurement for ATF2 Final Focus Systems**, 18th ATF2 Project meeting 2015, this meeting.

Time for experimental work

Work already done:

- M. Patecki et al., **Towards ultra-low β^* in ATF2**, MOBC1 IPAC2015, Richmond, USA.
- M. Patecki et al., **Beam tuning for low β^* in ATF2**, this meeting (and previous talks).

Installation of the octupole magnets is the next step towards the implementation of ultra-low β^* optics in ATF2



Installation of two octupole magnets:

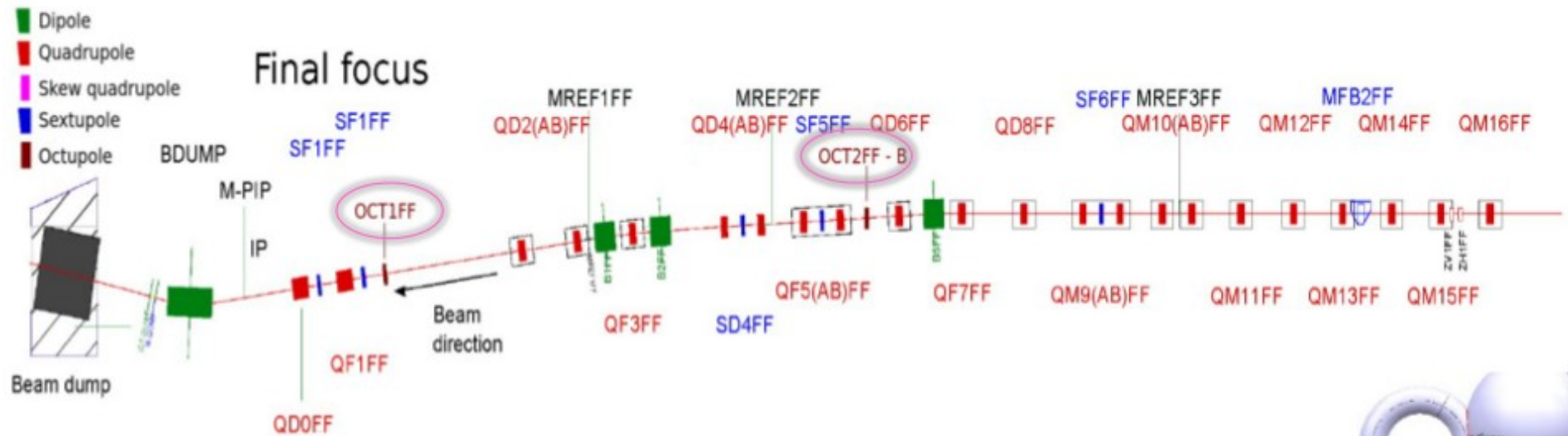
- Corrects both multipole fields and fringe fields.
- Makes sextupoles strength adjustment easier and therefore allows for more effective chromaticity correction.
- **Brings the IP beam size from 27nm to 20 nm for ultra-low β^* lattice (according to the simulations).**

Update on 2 Octupoles procurement for ATF2 Final Focus Systems

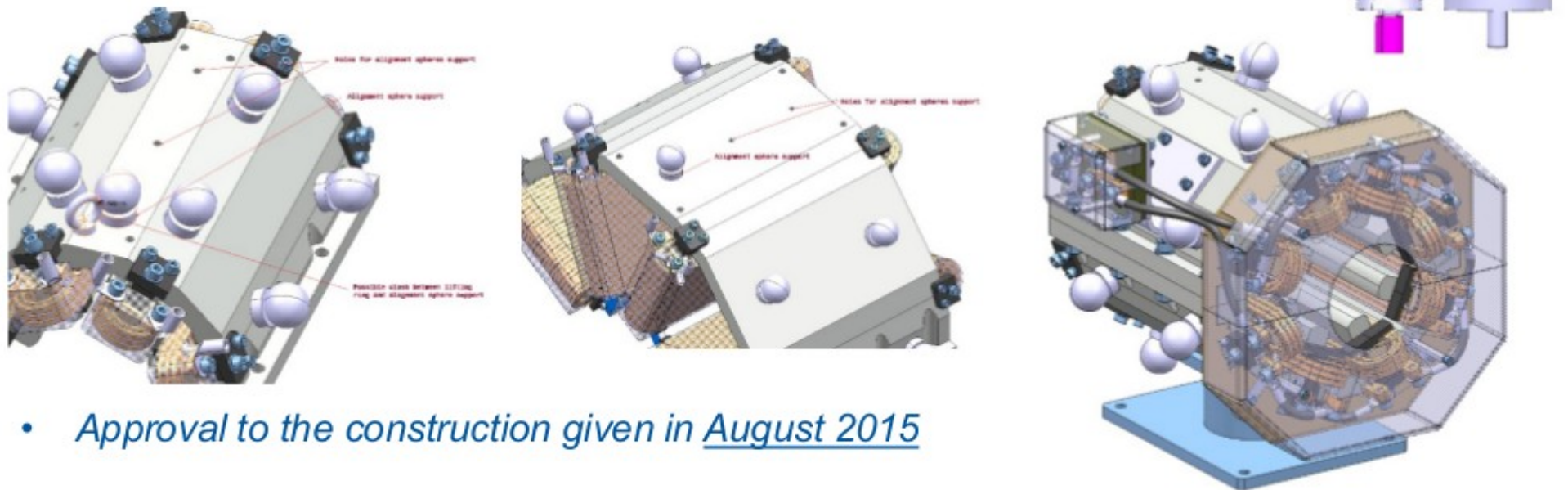
M. Modena - CERN

In 2015:

- Final location and magnet supporting policy for the 2 Octupoles was agreed with ATF colleagues: (OCT1 will have μm stages; OCT2 will be fix)

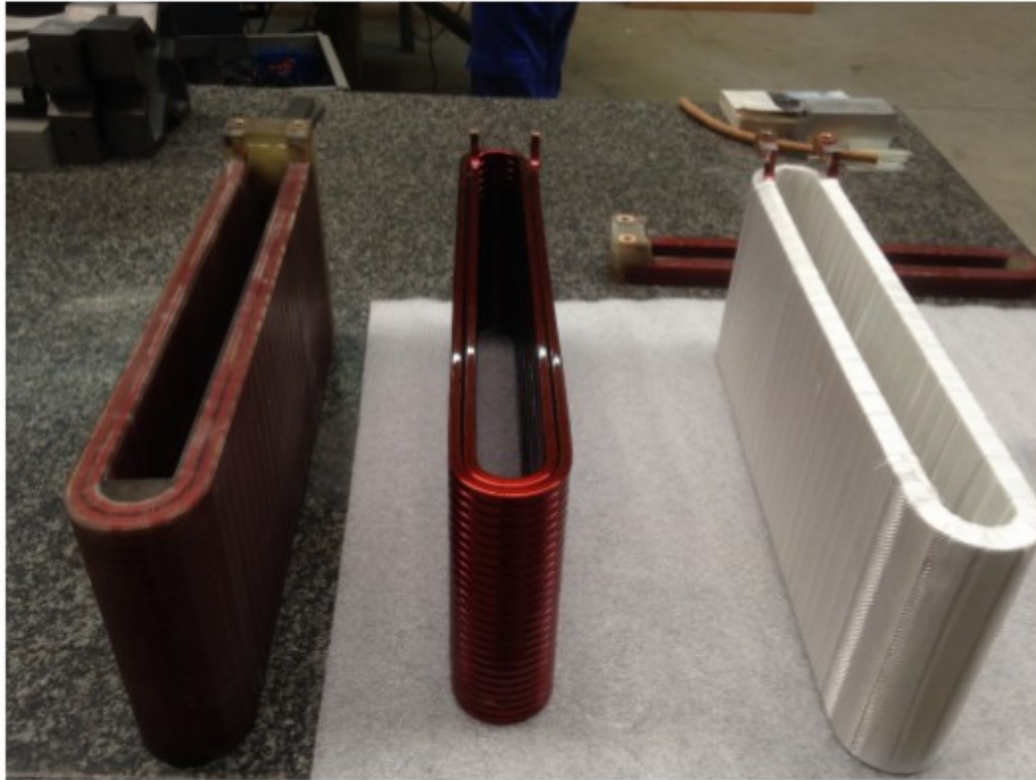


- Some small technical aspects/clashes were clarified and solved:



- Approval to the construction given in August 2015

- 20 coils (8 per octupoles + spares) were procured with Industry and certified



- 4 iron half-yokes (EDM machined) are still under procurement (outsourced by CERN Main Workshop).
- Delivery at CERN is expected for beginning of next month (February 2016)
- Assembly, certification and magnetic tests will follow.
- Still to be clarified with KEK-ATF the alignment procedures; CERN Survey colleagues are waiting for information from KEK/ATF.

Future plans:

- Continue low β^* study before the octupole magnets are installed.
- Install the octupole magnets and make them operational.
- Study the impact of the octupole magnets on already tested optics (10x1, 10x0.5).
- Start the ultra-low β^* study using the octupoles.