



Update on SC Magnets and Schedule

Brett Parker*

BNL-SMD

*For the ATF2 Superconducting Magnet Upgrade Collaboration

A horizontal dotted line of small yellow-green dots is located at the bottom of the slide, mirroring the one at the top.



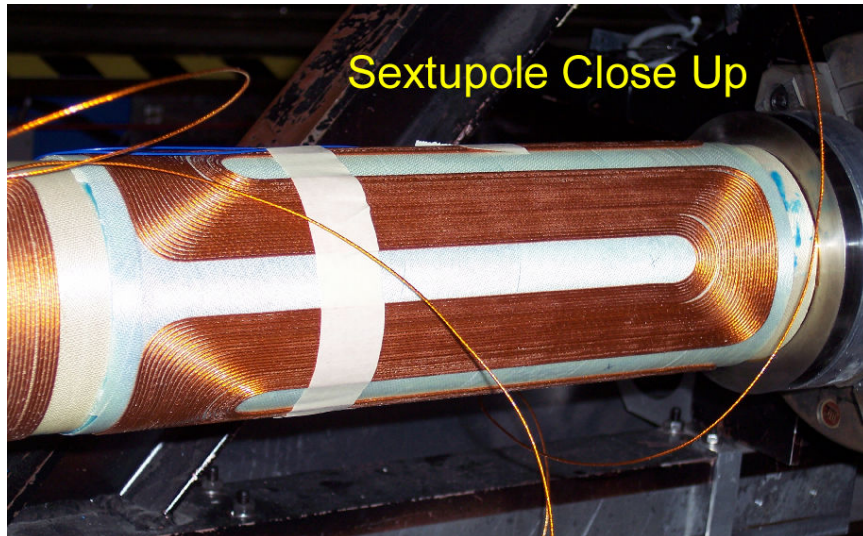
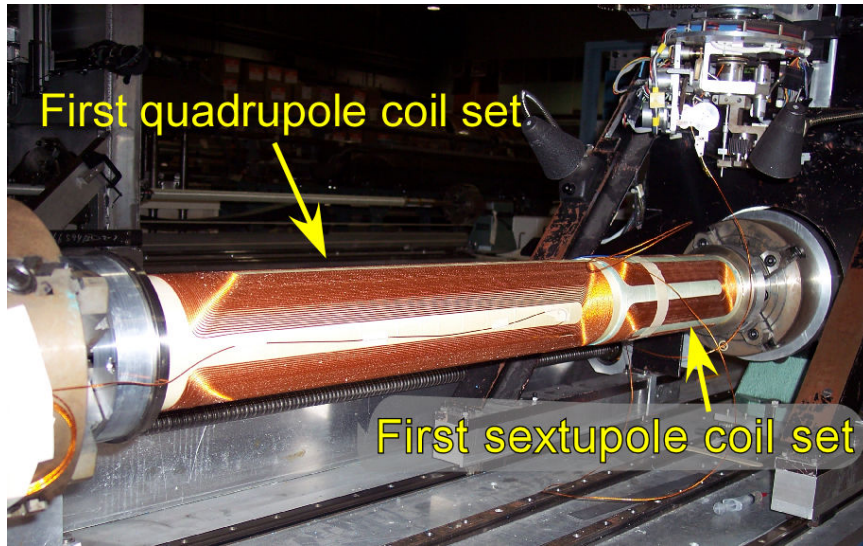
A Superconducting Magnet Upgrade of the ATF2 Final Focus: Collaboration List

Michael Anerella, John Escallier, Ping He, Animesh Jain, Andrew Marone, Brett Parker, Peter Wanderer, and Kuo-Chen Wu (BNL), Rogelio Tomas Garcia, Claude Hauviller, Eduardo Marin Lacoma and Frank Zimmermann (CERN), Nobuhiro Kimura, Kiyoshi Kubo, Tatsuya Kume, Shigeru Kuroda, Toshiyuki Okugi, Junji Urakawa, Toshiaki Tauchi, Nobuhiro Terunuma, Takayuki Tomaru, Kiyosumi Tsuchiya and Akira Yamamoto (KEK), Philip Bambade (LAL), Andrea Jeremie and Benoit Bolzon (LAPP), Paul Coe and David Urner (Oxford University), Andrei Seryi, Cherrill Spencer, and Glen White (SLAC)

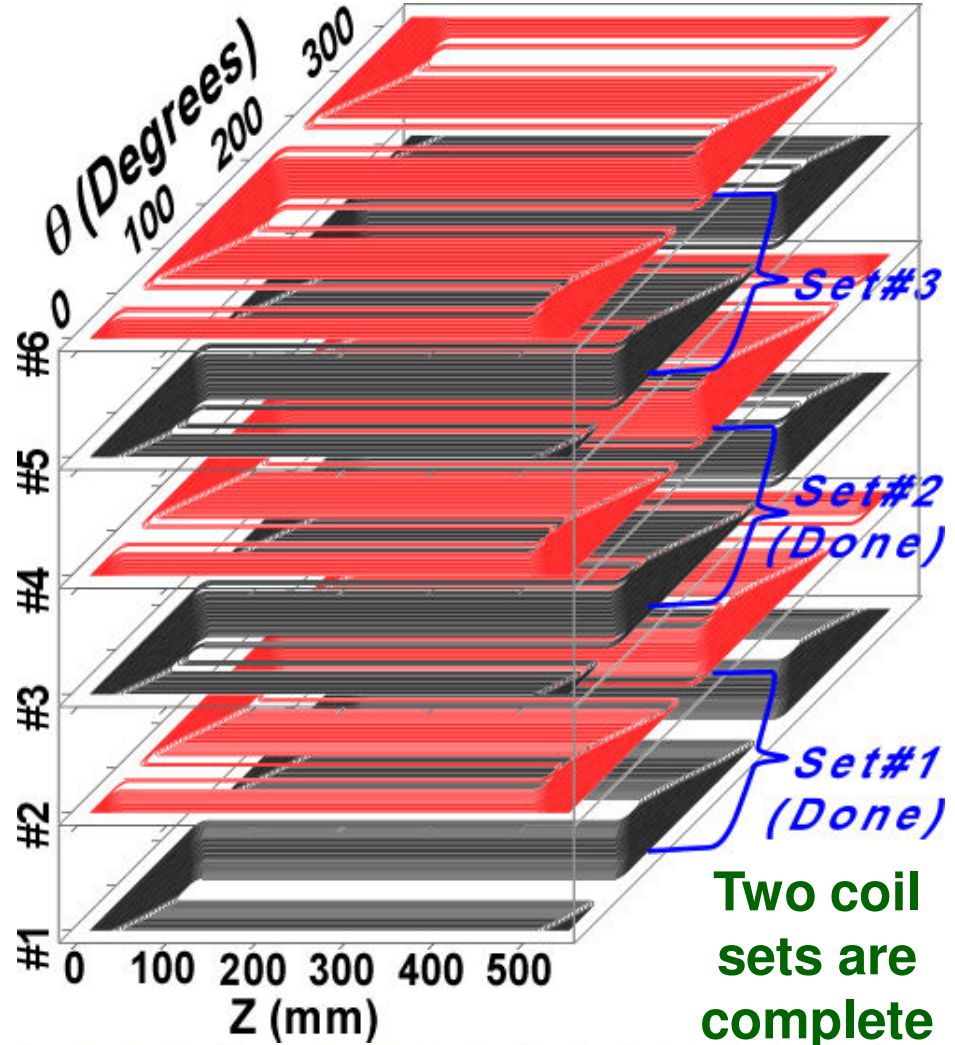
Co-Spokesmen: Brett Parker (BNL), Andrei Seryi (SLAC) and Toshiaki Tauchi (KEK)



ATF2 Coil Winding Status



Winding Schematic for ATF2 Quad





B-Field Harmonic Content (Units: 10^{-4} at R_{ref} of 25 mm) Measured After Winding Two Coil Sets

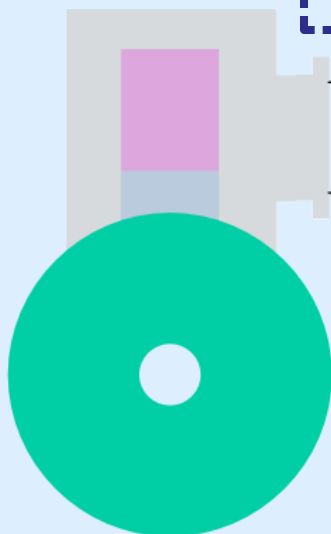
Quad'	Coil Set # 1	Coil Set # 2	Coil Set # 1 & 2
	After 3+4 uncured 11/24/2009 Run 10	1st Meas. (Uncured) 11/24/2009 Run 11	1st Meas. (3+4 Uncured) 11/24/2009 Run 12
I.T.F.(T/m/kA)	9.701	9.089	18.790
Fld. Ang.	-12.4	-15.6	-13.9
Leff (m)	--	--	--
b3	-0.7	3.8	1.3
b4	6.0	-8.6	-0.9
b5	13.4	-13.3	0.8
b6	22.2	-23.3	0.2
b7	-0.1	0.2	0.1
b8	0.0	0.0	0.0
b9	0.0	0.1	0.0
b10	0.1	0.0	0.1
b11	-0.1	-0.1	0.0
b12	0.0	0.0	0.0
b13	0.0	0.0	0.0
b14	0.1	-0.1	0.0
b15	0.0	0.0	0.0
a3	5.6	-3.8	1.2
a4	26.5	-29.9	-0.5
a5	14.0	-15.4	0.0
a6	0.1	0.1	0.0
a7	0.4	-0.1	0.1
a8	-0.1	0.4	0.1
a9	0.2	0.1	0.1
a10	-0.5	0.0	-0.3
a11	0.0	0.0	0.0
a12	0.0	0.0	0.0
a13	0.0	0.0	0.0
a14	0.0	0.0	0.0
a15	0.0	0.0	0.0

Sext'	Coil Set # 1	Coil Set # 2	Coil Set # 1 & 2
	After 3+4 uncured 11/23/2009 Run 7	1st Meas. (Uncured) 11/23/2009 Run 8	1st Meas. (3+4 Uncured) 11/23/2009 Run 9
I.T.F.(T/m/kA)	110.70	82.65	193.33
Fld. Ang.	15.2	14.0	14.8
Leff (m)	--	--	--
b1	173.1	-227.6	0.0
b4	6.5	-3.7	2.3
b5	12.8	-18.9	-0.4
b6	15.0	-19.7	0.4
b7	25.5	-33.0	0.4
b8	0.3	0.3	0.5
b9	0.3	0.3	0.2
b10	0.2	0.6	0.0
b11	0.8	0.2	0.8
b12	0.2	-0.3	0.1
b13	-0.1	0.0	-0.2
b14	-0.1	0.0	-0.1
b15	-0.6	-0.3	-0.4
a1	44.9	-67.3	-1.7
a4	6.2	-13.7	-2.4
a5	8.1	-15.0	-1.5
a6	30.4	-48.6	-4.1
a7	-1.1	0.5	-0.5
a8	-0.1	0.0	0.1
a9	0.3	1.0	0.1
a10	0.2	-0.3	0.2
a11	0.1	-0.4	0.2
a12	-0.6	0.3	-0.5
a13	-0.1	0.2	-0.1
a14	0.0	0.0	0.1
a15	0.0	0.0	0.0



Cryogenics Interface Status

ATF2 magnet & cryostat design (BNL Produced)



New box at ATF2 with cryocoolers, control valves, current leads etc. for 4.2K operation.

4.2K LHe Interface

Cryo' interface as discussed at ALPG'09.

ATF2 SC FD face-to-face meeting at BNL Tuesday 24 November 2009 from 08:00 to 18:00 US/Eastern at BNL, USA (902A Conference Room 63) support: parker@bnl.gov

Material: [Webex Information](#)

[Tuesday 24 November 2009](#)

Tuesday 24 November 2009

[top](#)

08:00->09:00 Setup and Welcome

Description:

- 1) Time for preparation before start of meeting
- 2) Welcome and Introductions

Meet at BNL

09:00->12:00 Morning Session

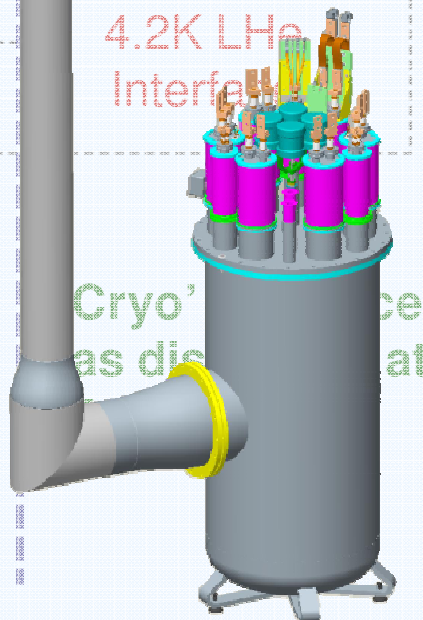
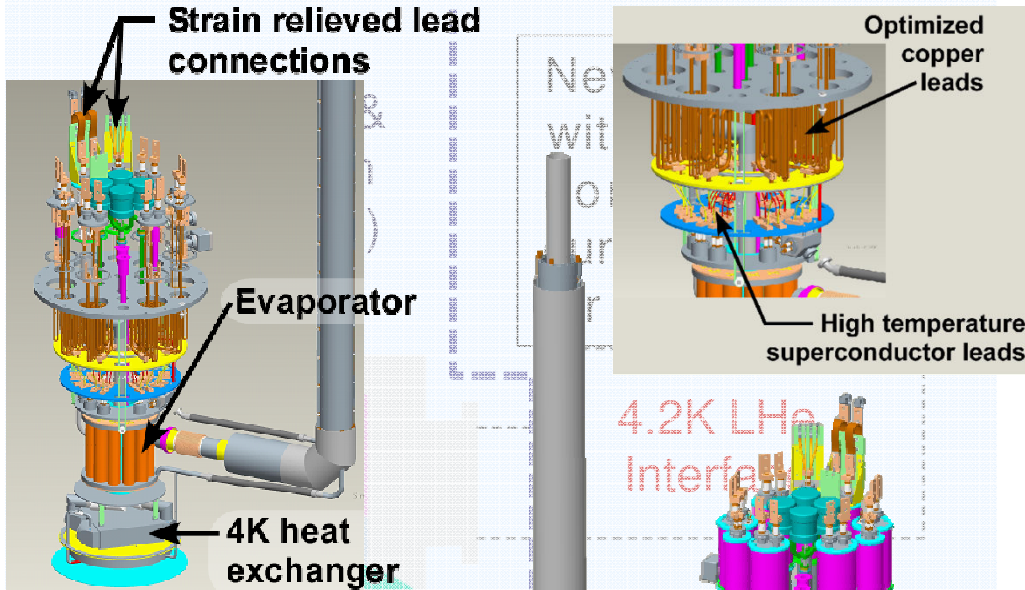
09:00	ATF2 Superconducting Upgrade Introduction & Overview (30') (Slides)	Brett Parker
	1) Review work that has already been done. 2) Discuss work needed for the next ATF2 TB review 3) Discuss plan for today's meeting	
09:30	Status of the KEK Cryogenic Design (30') (Slides)	Nobuhiro Kimura and Takayuki Tomaru
10:00	Review and Discussion of the BNL Mechanical Design (1h00') (Slides) Short presentation plus viewing of CAD model	Andy Marone and Henry Hocker
11:00	Discussion of Laser Access Ports (30')	Brett Parker (David Urner and Paul Coe via webex)
11:30	Discussion of Supports/Stabilization Structure (30') (Slides)	Brett Parker (Andrea Jeremie and Benoit Bolzon via webex)

A lot of progress was made at a recent all day meeting held at BNL.

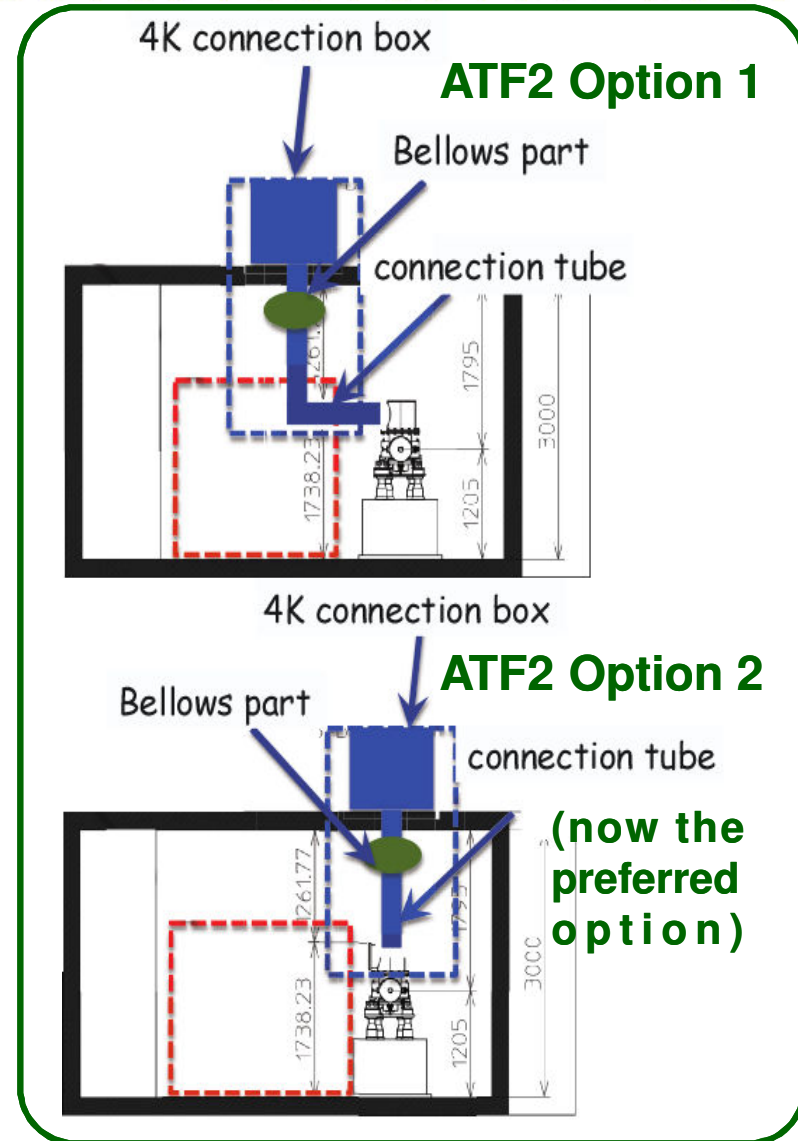


Cryogenics Interface Status

Service Cryostat Under Construction at BNL

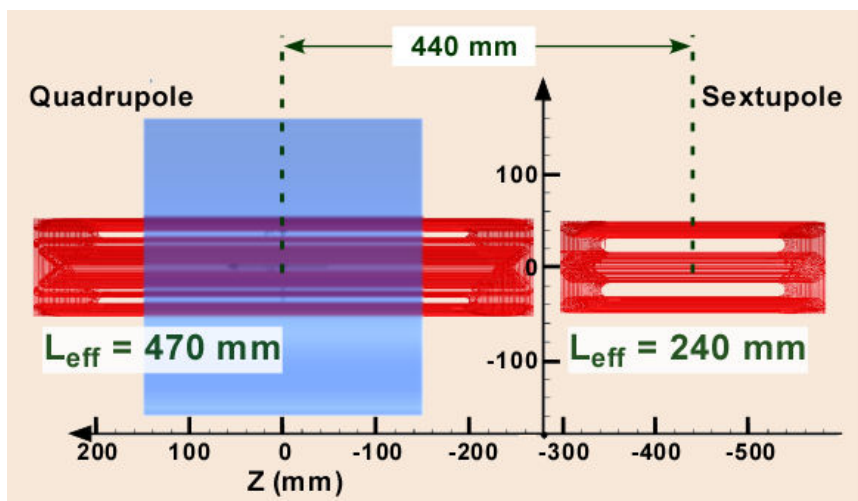
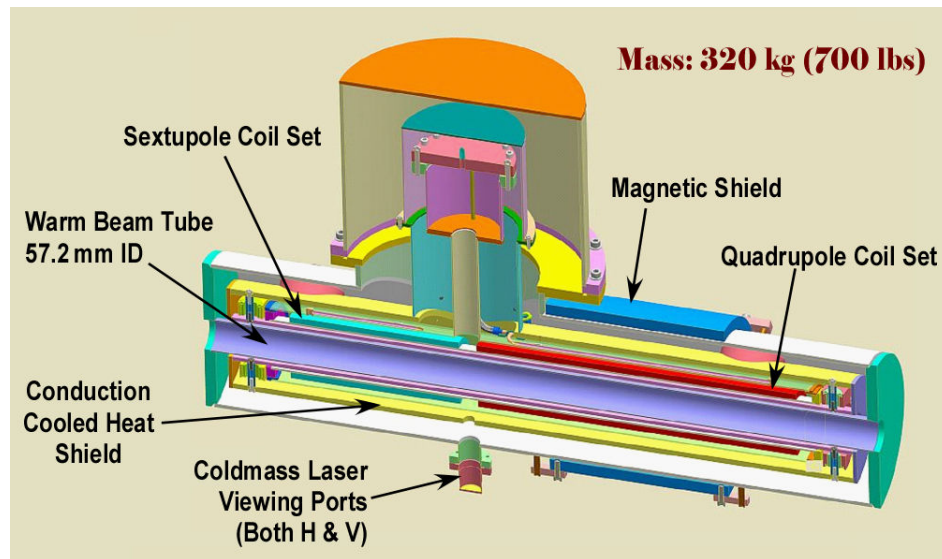
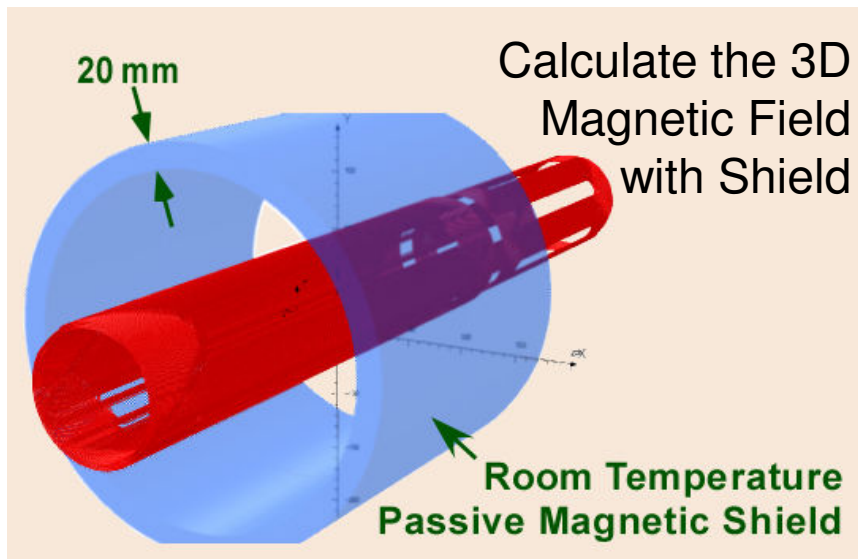


Develop option that allows for ILC-like 1.9K tests at BNL and 4.2K operation at ATF2 (KEK) with cryo-coolers.





Laser View Port Interface Status



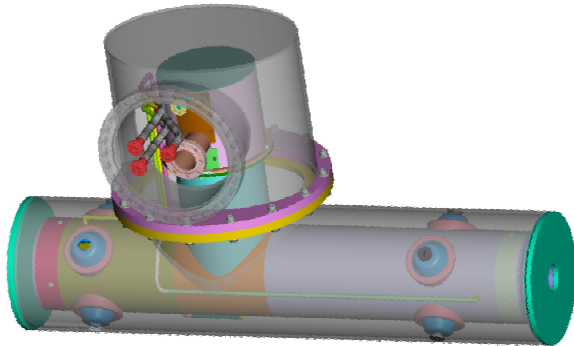
With newest heat shield design it is fairly straightforward to add laser viewing ports. At our recent "Face To Face" meeting we tentatively decided to have these ports positioned at the respective magnetic centers. Before making a final decision we have to evaluate the impact of putting small holes in the quadrupole magnetic shield.



ILC R&D Prototype & ATF2 Comparison

- Both magnets will be tested at 1.9K with the ILC-style Service Cryostat (SC) at BNL.
- The ATF2 magnet will be tested at BNL at 4.2K both with SC and ATF2 Cryogenic Box before being shipped to KEK.
- The ATF2 magnet can be tested with beam; we do not have a way to test R&D prototype with beam.

ATF2 Upgrade Magnet



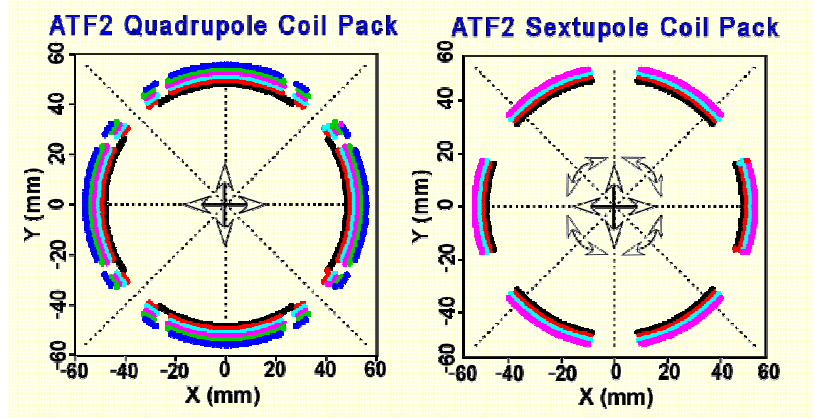
ILC QD0 Full-Length R&D Prototype Magnet



ATF2 Coil Package Information

ATF2 Upgrade Coil Design Status as of 18-November-2009, B. Parker										
Element	Multipole	Magnetic	Integral	Body	Corrected	Max. I	Resulting		Resulting	
Description		Length	TF	TF	Body TF*	Scenario	Field or		Offset or	
	Bn or An	(m)	(T/m ⁿ⁻¹)/A	(T/m ⁿ)/A	(T/m ⁿ)/A	(A)	Gradient		Rotation	
								Unit		Unit
Main Quadrupole	B2	0.470	0.026834	0.057093	0.058234	275	16.01	T/m	-	-
Dipole Cor.	B1	0.470	0.000352	0.000750	0.000780	20	0.0156	T	1.0	mm
Skew-Dipole Cor.	A1	0.470	0.000349	0.000742	0.000771	20	0.0154	T	1.0	mm
Main Sextupol	B3	0.240	0.190547	0.793946	0.793946	130	103.21	T/m ²	-	-
Skew-Sext. Cor.	A3	0.240	0.193792	0.807467	0.807467	20	16.149	T/m ²	155	mr
Quad. Cor.	B2	0.240	0.006172	0.025715	0.025715	20	0.514	T/m	5.0	mm
Skew-Quad. Cor.	A2	0.240	0.005884	0.024515	0.024515	20	0.490	T/m	4.8	mm

*Estimated effect from iron tube used for passive shielding



- Have complete set of correctors to shift magnetic center of the quadrupole and sextupole independently (like ILC).
- For “Pushed-Beta” will also evaluate options for higher order correctors.



Presentation Summary

Recently the ATF2 Superconducting Magnet Upgrade Collaboration has grown considerably* and a lot of progress has been made recently (esp. during the face-to-face meeting) both in terms of coil production and fine tuning parameters to enable a robust experimental program.

*Please contact me if you want to be added to the collaboration (or possibly just the mailing list).