

Status of the B-Field Maps and BDOT Measurements

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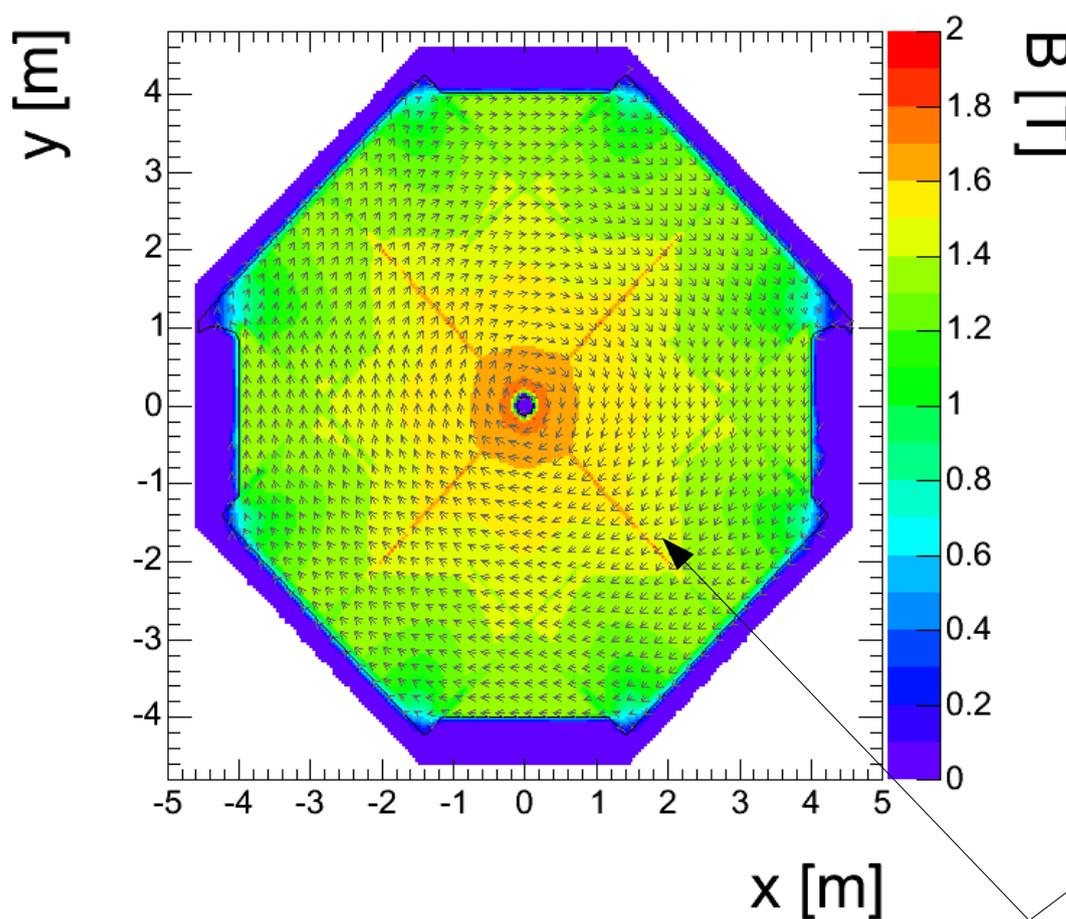
July 15, 2005

Far Detector B-field Maps

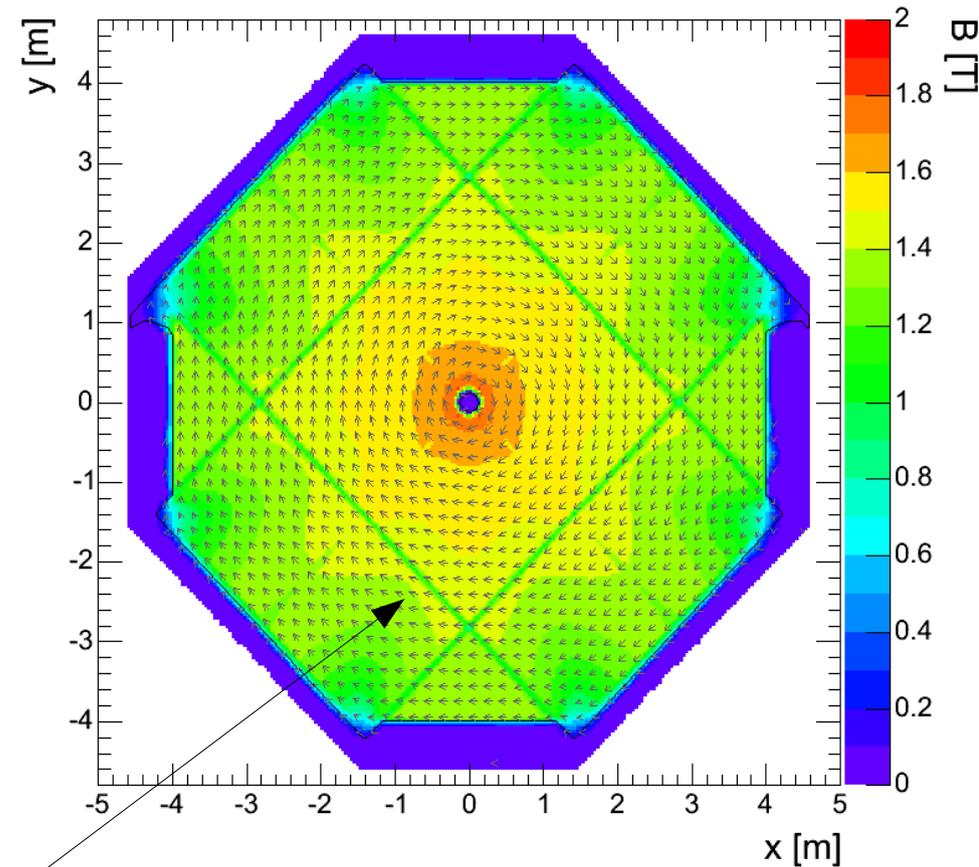
- **Latest Map is 204**
 - Reduced data in the air field.
 - Map cover all the steel.
 - Formatted map in MINOS xyz coordinate system.
 - Current is set to 15.2 kAmps-turns (190 turns x 80 Amps).
 - Variable slot model.
 - Mid-module model with ~300k elements.
- **(Preliminary) New Map 205**
 - Same as map 204 but includes a fixed bug found in the FEA post-precessing procedure which affects the field on the slots.

Differences between Map 205 and 204

Map 205 - Far Detector - 06/30/2005



Map 204 - Far Detector - 05/03/2005



$$\langle \Delta B \rangle = \langle B(205) - B(204) \rangle = 1.4\%$$

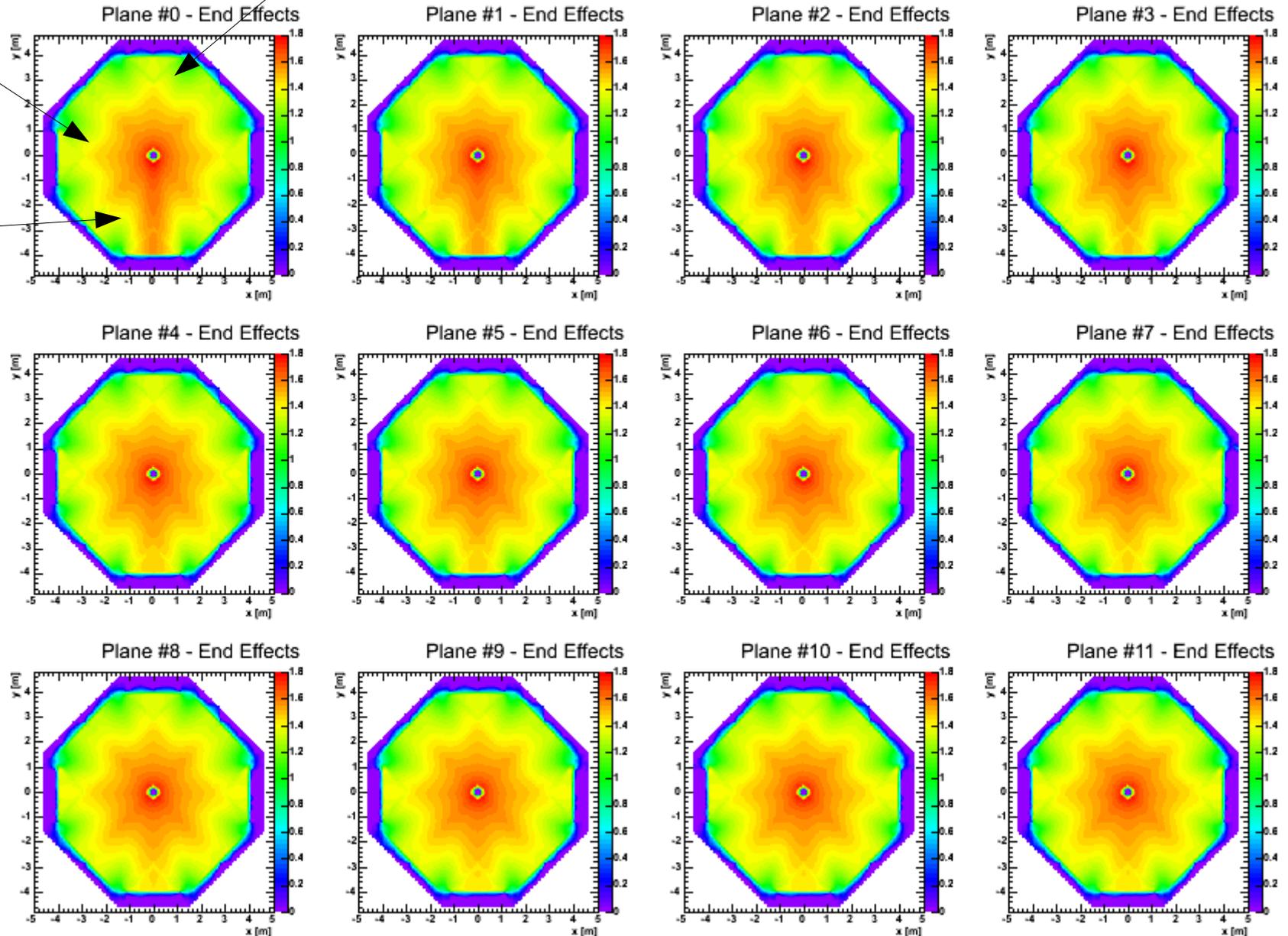
$$\langle \Delta B \text{ RMS} \rangle = 2.9\%$$

End-effect Models

3% reduction of field because of end effects

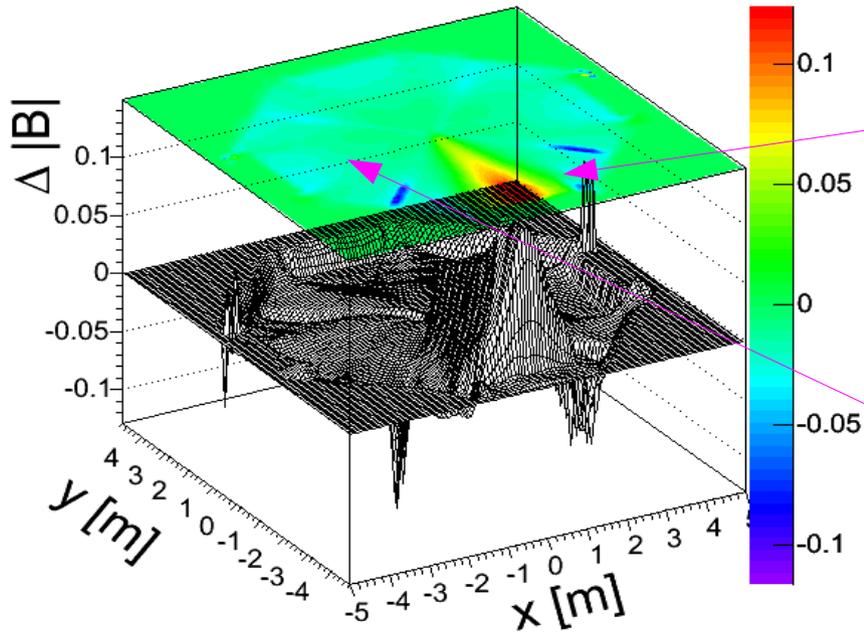
First Plane
Return leg

10% increment in
the coil leg region



Differences of the end-effect model

End-Effect $\Delta |B| = |B(\text{plane } 0)| - |B(\text{plane } 11)|$



10% increment in
the coil leg region

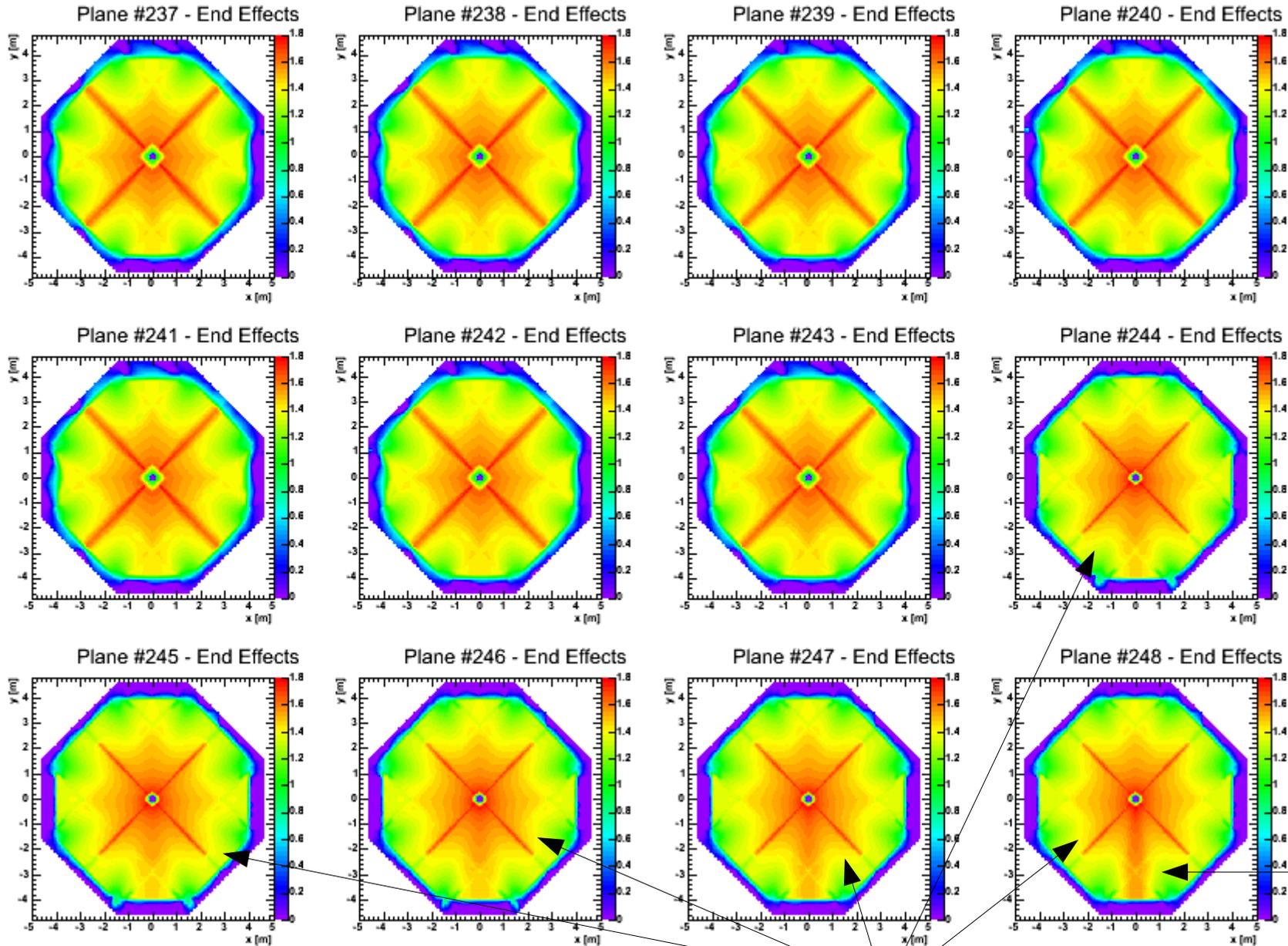
3% reduction of field
because of end effects

**Average Difference between map 205 (single plane model)
and plane 11 (end-effect):**

$$\langle \Delta B \rangle = \langle B(205) - B(\text{plane } 11) \rangle = -1.42\%$$

$$\langle \Delta B \text{ RMS} \rangle = 4.93\%$$

(Supermodule) Gap-effect Models

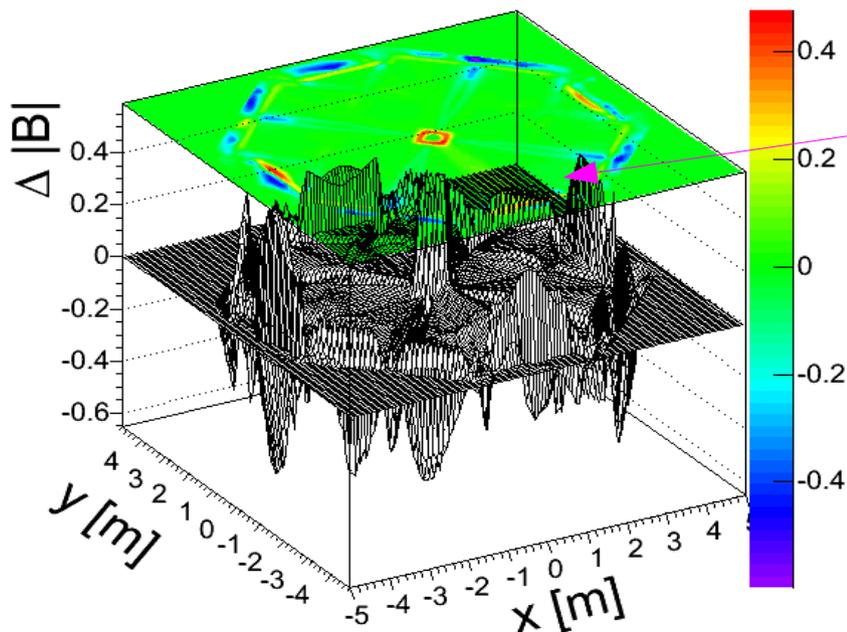


Plane next
to gap
Return leg

Finely meshed planes

Differences of the gap-effect models

Gap Effect $\Delta|B| = |B(\text{plane248})| - |B(\text{plane237})|$



20% increment in
the coil leg region

**Average Difference between map 205 (single plane model)
and plane 237 (gap-effect):**

$\langle \Delta B \rangle = \langle B(205) - B(\text{plane 237}) \rangle = -2.77\%$ (most of the diff in slots, edges and coil)
 $\langle \Delta B \text{ RMS} \rangle = 10.4\%$

BDOT Systems

- At the FD:
 - ADC calibration on the terminal strip cards will be taken next week.
 - Work on a bad relay in the BDOT/DCS box of SM1 PS is planned for fall.

- At the ND:
 - Initial work on the re-installation of retrofitted BDOT boards (include a common mode filter) have been done. Completion of this work is expected in two weeks.

- Working on the parametrization of the end- and gap- effect models to implement it in the reconstruction.
- New maps for the FD will be released soon.

ND B-field Maps:

- Latest map is 159 which is only a 2D model.
- Working on new maps with better coil geometry:
 - Mid-detector 3D plane model.
 - End-effect model for the north and south return coils (north leg closer to the steel than south leg).