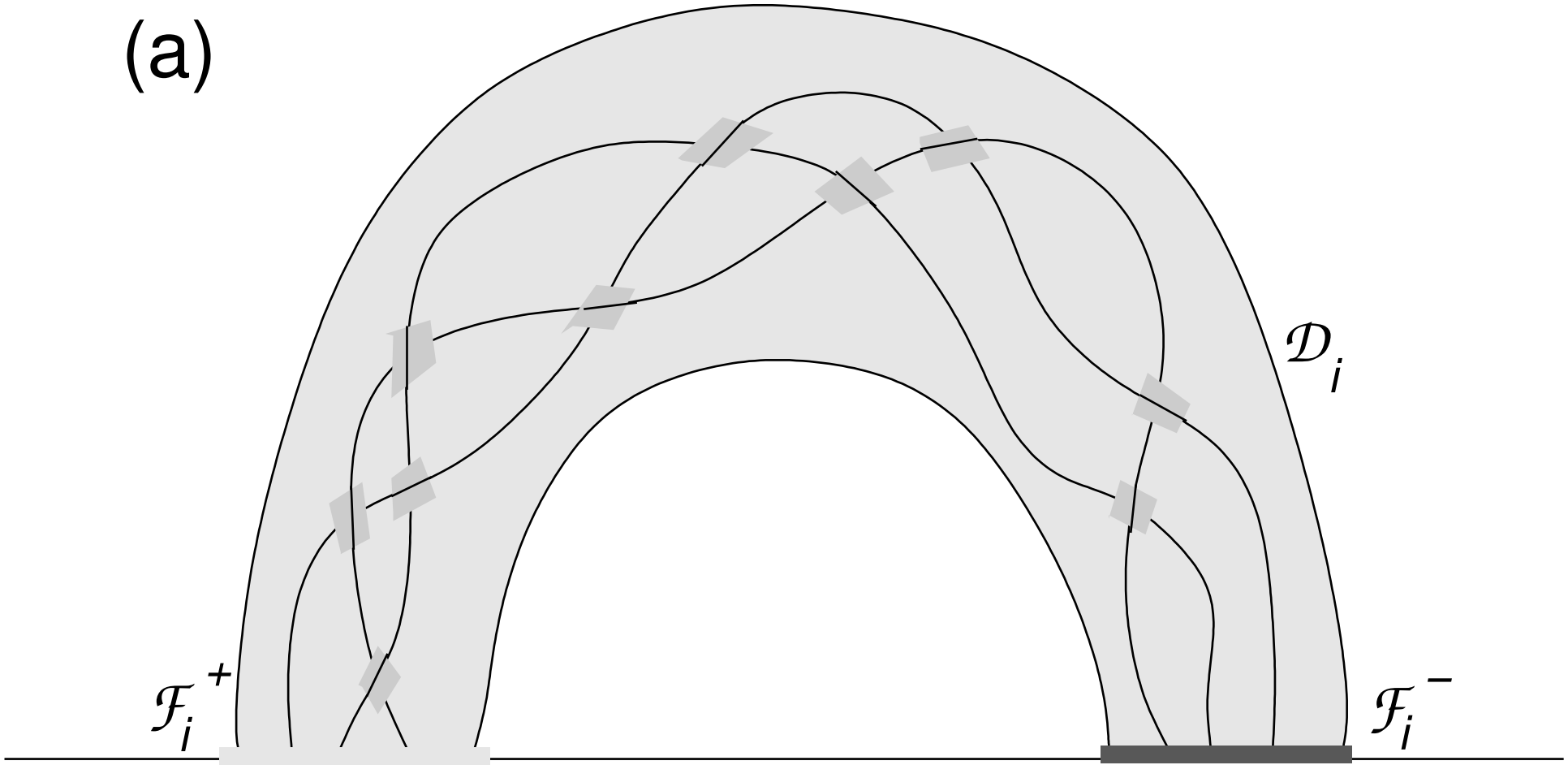
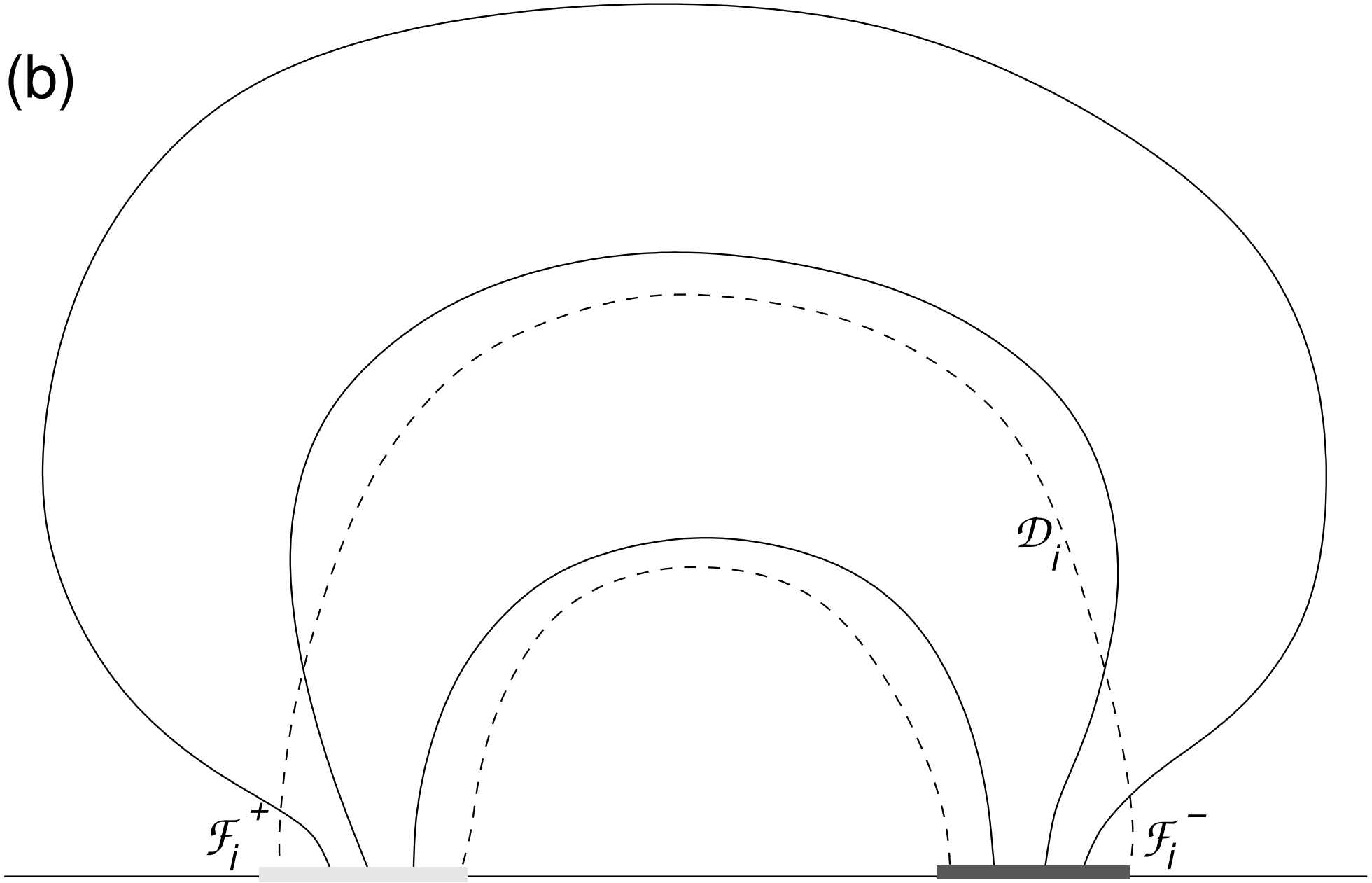
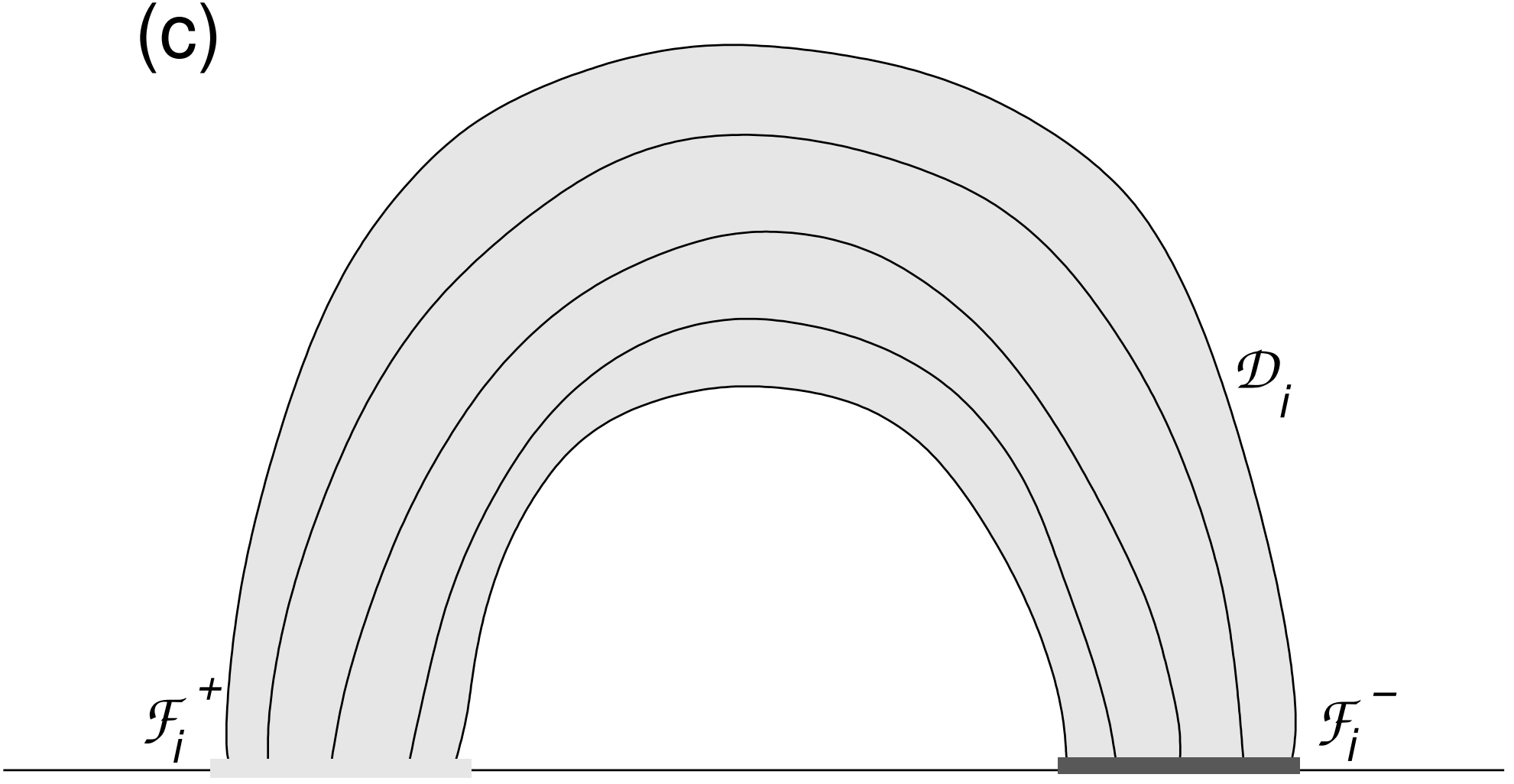
Additive Self-Helicity


(a)
$\mathcal{D}_i$
$\mathcal{F}_i^+$
$\mathcal{F}_i^-$


(b)
$\mathcal{D}_i$
$\mathcal{F}_i^+$
$\mathcal{F}_i^-$


(c)
$\mathcal{D}_i$
$\mathcal{F}_i^+$
$\mathcal{F}_i^-$

Geometrical Consistant

Non-Geometrical Consistant

As the volume V of the corona is by the B field mapping:

$$V = \bigcup D_i$$

$$(\mathbf{B}_i - \mathbf{B}_o) \cdot \mathbf{n}\big|_{\partial\Omega} = 0$$

Boundary condition for the relative helicity:


NO!

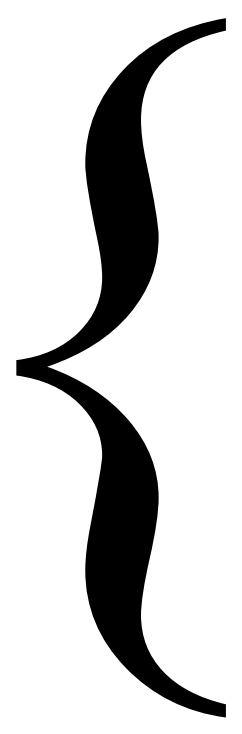
Longcope & Malanushenkov (2008)

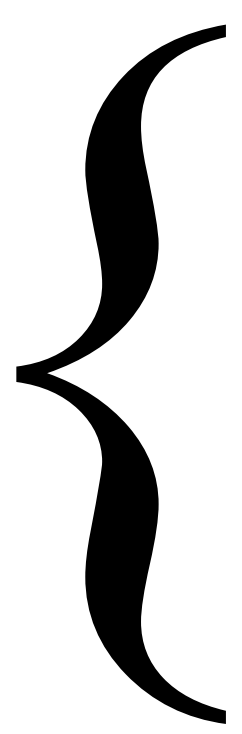
$$\mathbf{B}_R = \nabla\Phi$$

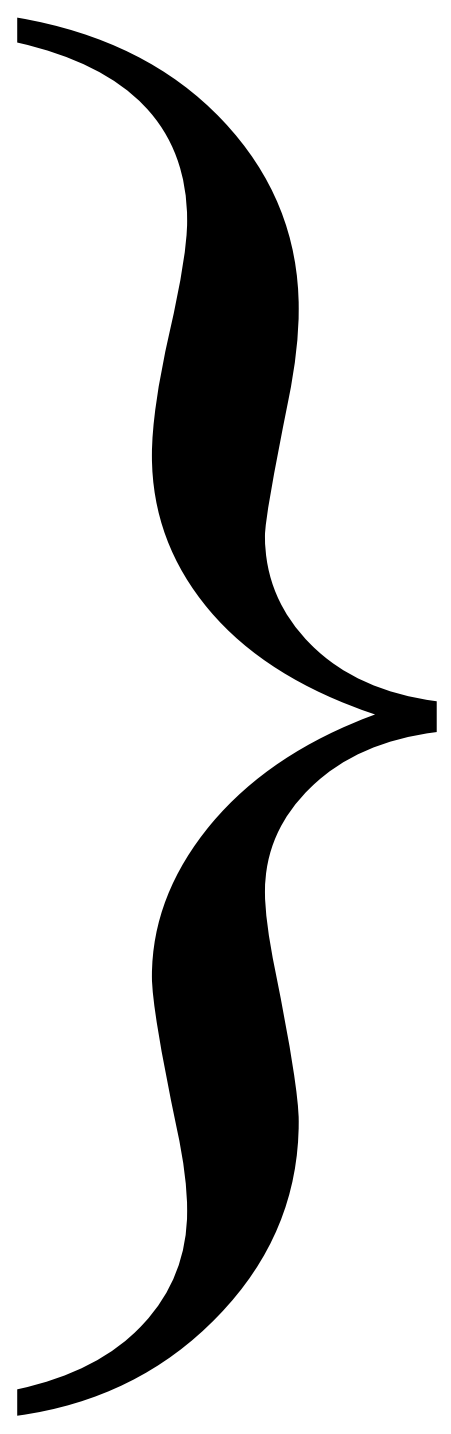
$$\nabla^2\Phi = 0$$

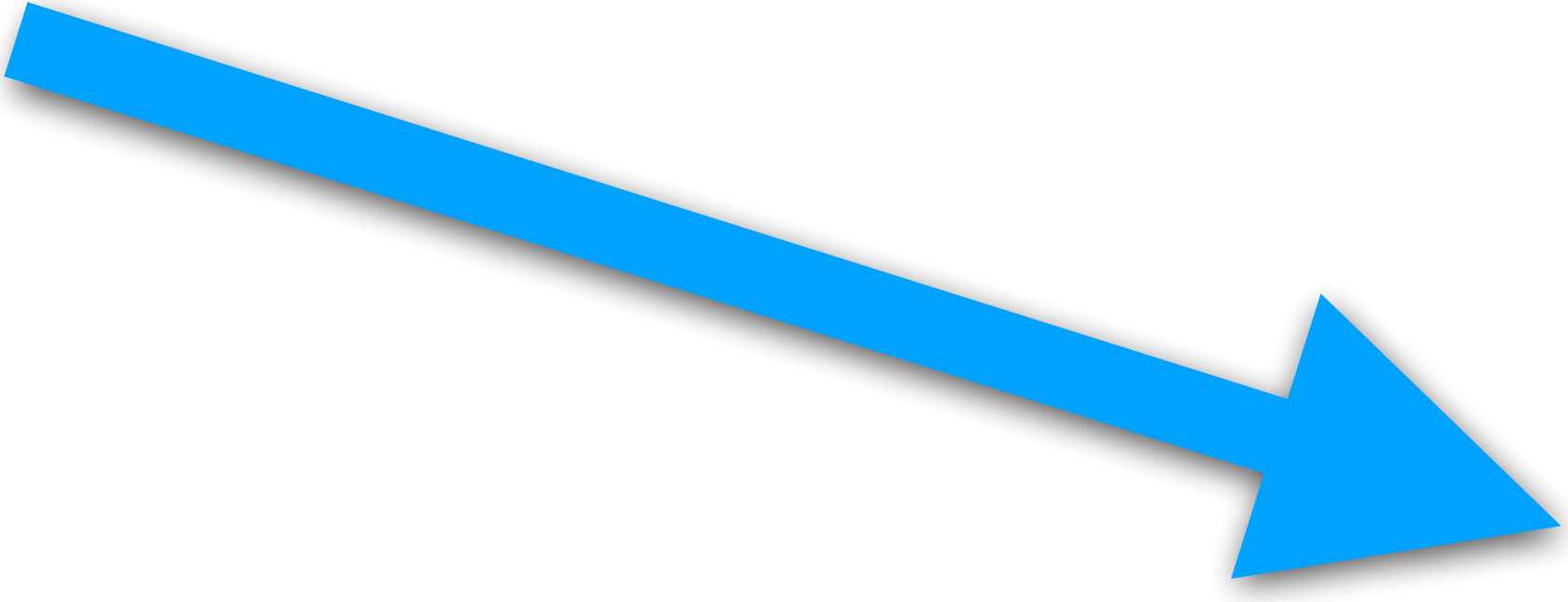
$$\nabla\Phi \cdot \mathbf{n}\Big|_{bottom} = \mathrm{B}_z$$

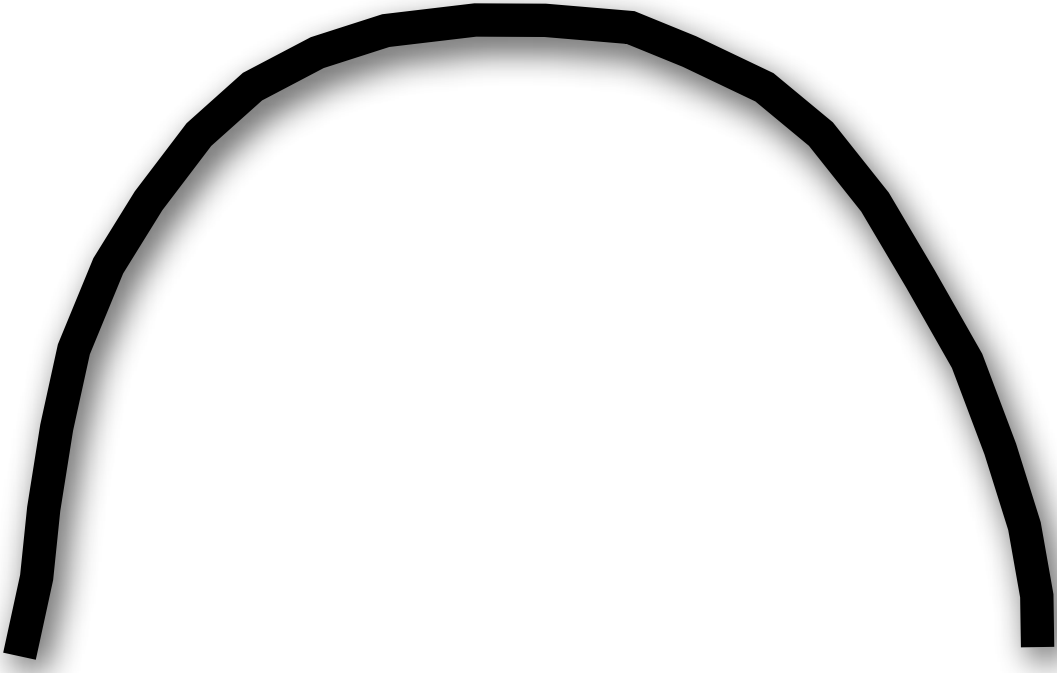
$$\nabla\Phi \cdot \mathbf{n}\Big|_{other} = 0$$

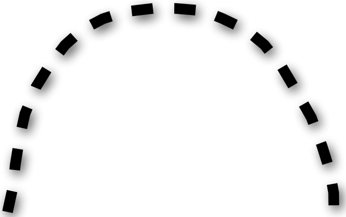


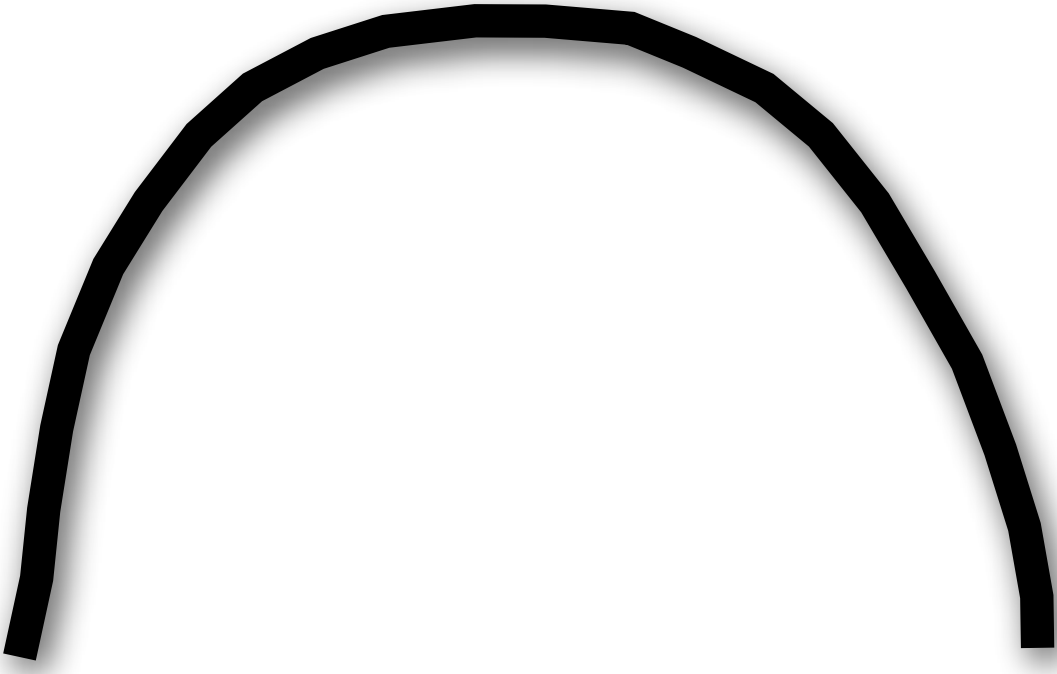


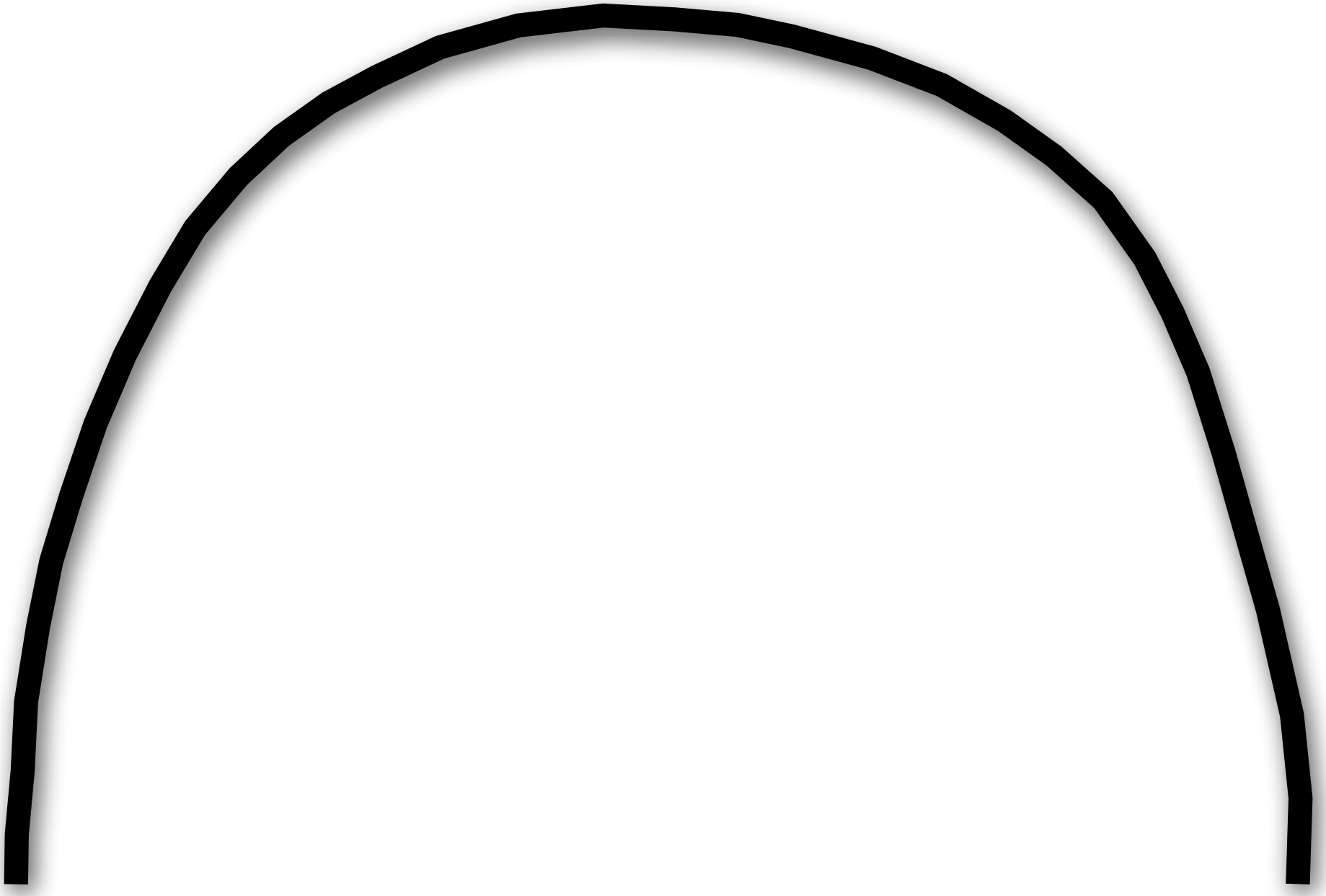


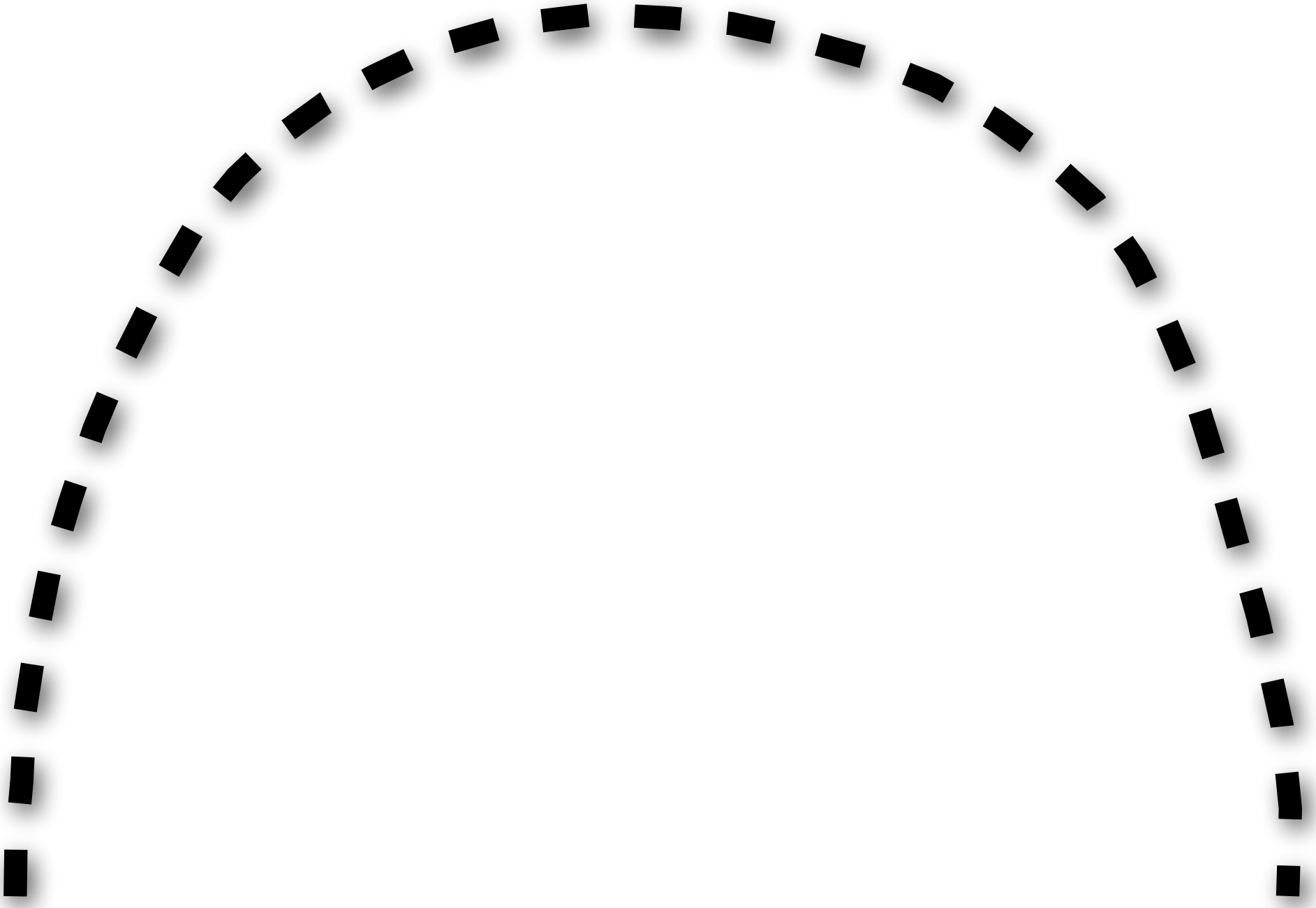


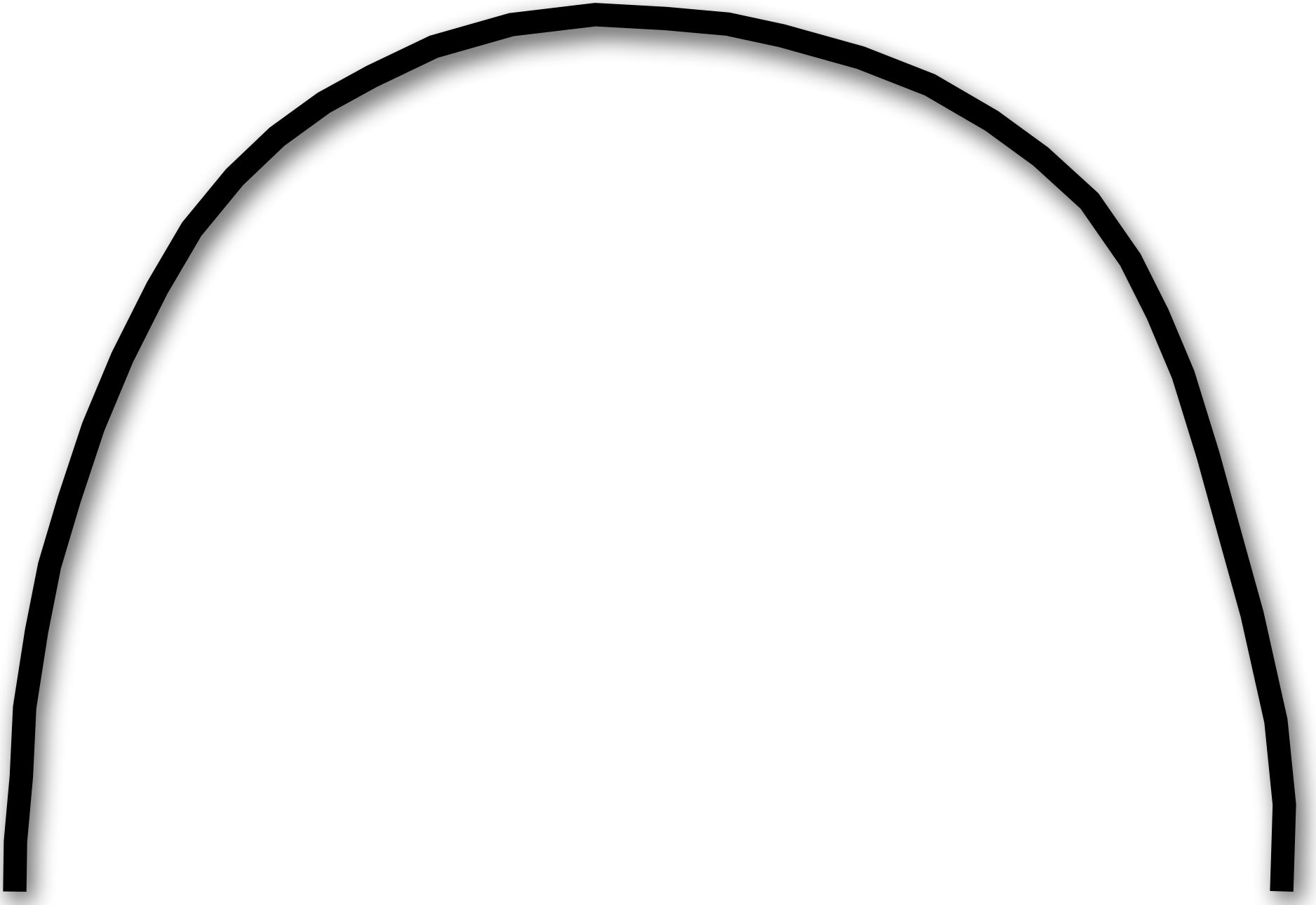










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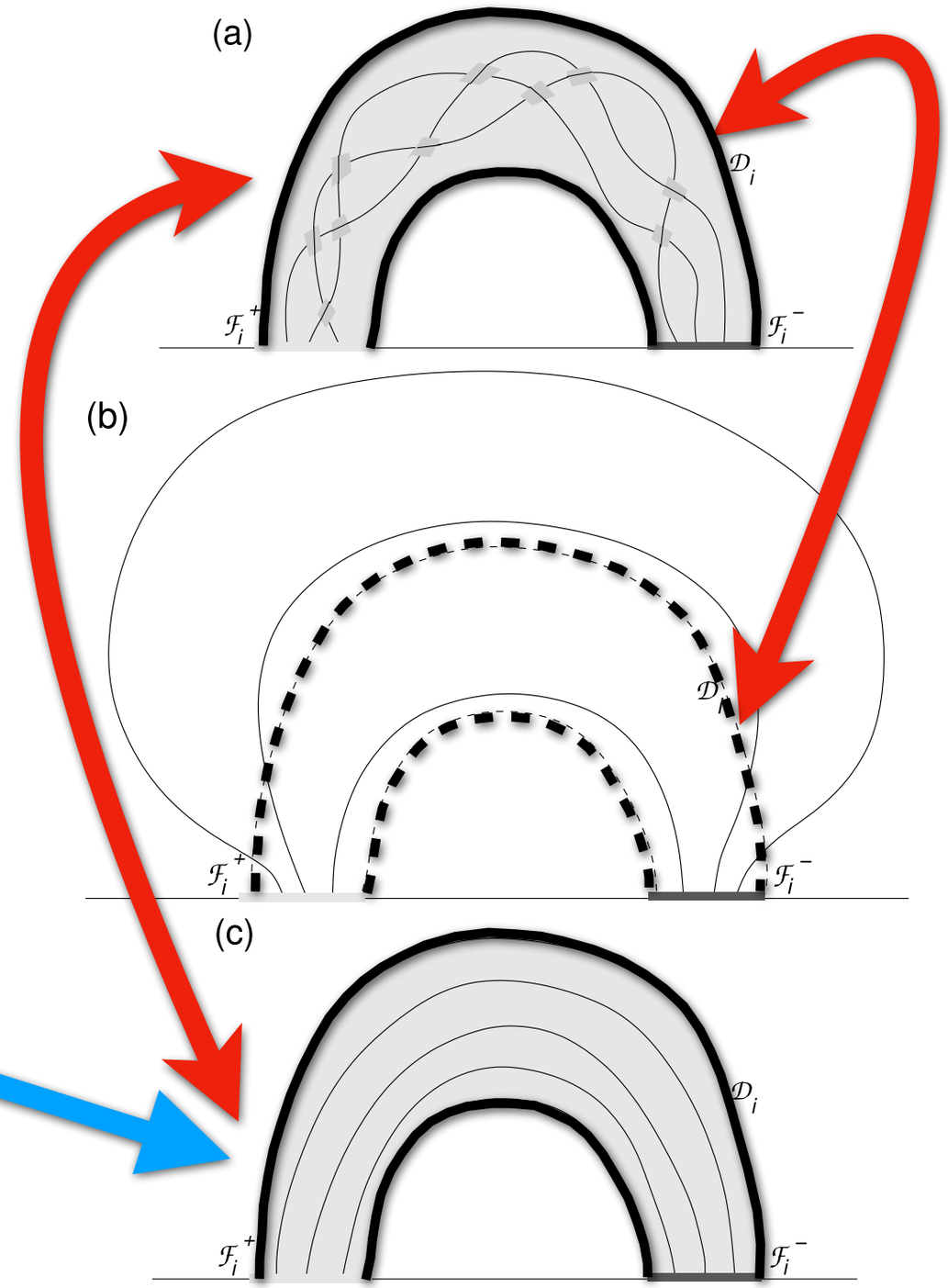
$$(\mathbf{B}_i - \mathbf{B}_o) \cdot \mathbf{n}\big|_{\partial\Omega} = 0$$

$$\left\{ \begin{array}{l} \mathbf{B}_R = \nabla\Phi \\ \nabla^2\Phi = 0 \end{array} \right\}$$

$$\left\{ \begin{array}{l} \nabla\Phi \cdot \mathbf{n}\big|_{bottom} = \mathrm{B}_z \\ \nabla\Phi \cdot \mathbf{n}\big|_{other} = 0 \end{array} \right\}$$

Geometrical Consistant

Non-Geometrical Consistant



Longcope & Malanushenkov (2008)

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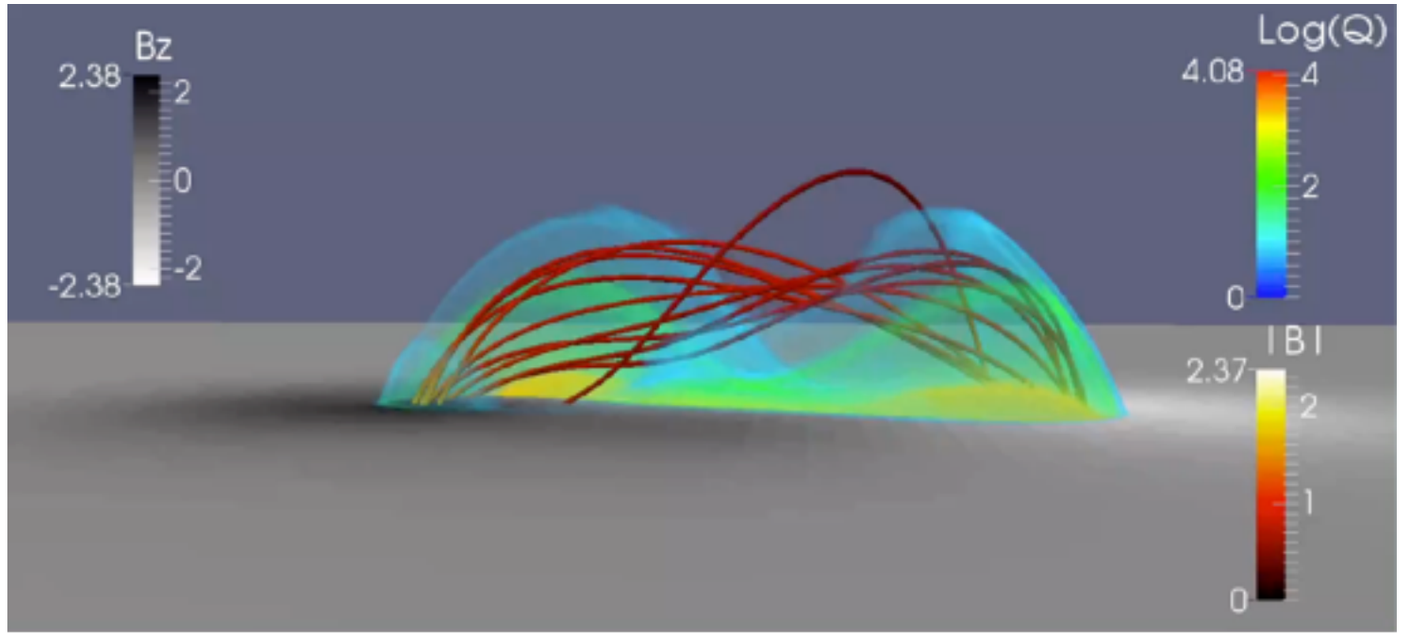
Separatrix of the MFR

The core of the MFR is highly twisted, the ambient field is sheared arched. There should be some separatrix or quasi-separatrix between them.

e.g.1 TD model



e.g.2 Reconstructed MFR