

# RF Safe Transmission Line for MRI

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## Technology description

### Unmet Need

Magnetic resonance imaging (MRI) machines produce images of the organs and tissues within the human body through a magnetic field and radio waves. MRI imaging is also well-suited for interventional radiology and interventional cardiology, where MRI images are used to track the position of interventional instruments. Many techniques have been proposed in order to track positions of interventional instruments in an MRI scanner. Currently, the fastest tracking has been achieved by placing with miniature magnetic resonance receive coils around the medical instruments. However, during interventional MRI procedures, the cables connected to the receive coils can cause strong radio frequency (RF) induced heating of the medical instruments. In order to prevent overheating of the instruments there is a need for a device that can reduce the heat produced by the coils while still keeping intact the effectiveness of instrument tracking.

### Technology Overview

Johns Hopkins inventors have developed an improved electrically conductive transmission line that is radio frequency (RF) safe. These transmission lines do not include any inductive coupling elements. Instead, multiple coils constructed from twisted pairs of wires are used to block the common mode of the received magnetic resonance signal that can cause heating, while passing the differential mode that is used for tracking and/or imaging. These twisted pair coils are easier to manufacture than the pre-existing inductive coupling element-based transmission lines, and occupy less overall volume inside a medical device.

## Institution

[Johns Hopkins University](#)

## Inventors

[Henry Halperin](#)

Professor

Cardiology DOM SOM

## 联系我们



叶先生

电话：021-65679356

手机：13414935137

邮箱：yeyingsheng@zf-ym.com