

Wideband bright- and black-blood late gadolinium enhancement imaging for patients with cardiac implantable electronic devices

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Introduction

- PSIR LGE: good contrast between healthy myocardium and scar tissue, but poor scar-to-blood contrast¹
- SPOT: joint bright- and black-blood imaging to provide detailed cardiac anatomy and improved scar contrast²
- Cardiac implantable electronic device (CIED): severe hyperintensity & banding artefacts on MRI³

Objective: Wideband SPOT to allow unprecedented scar localization and detection in patients with CIED.

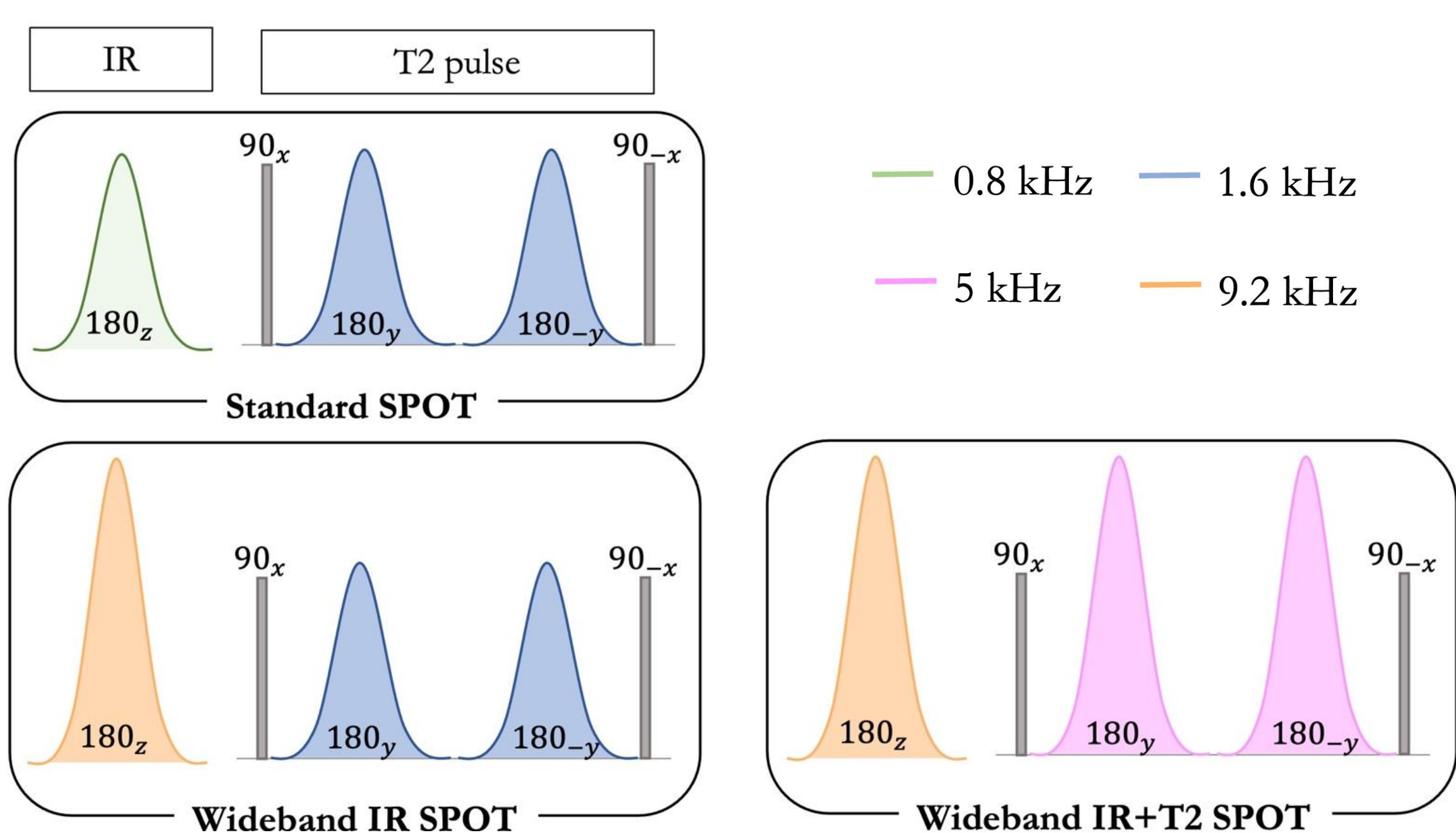
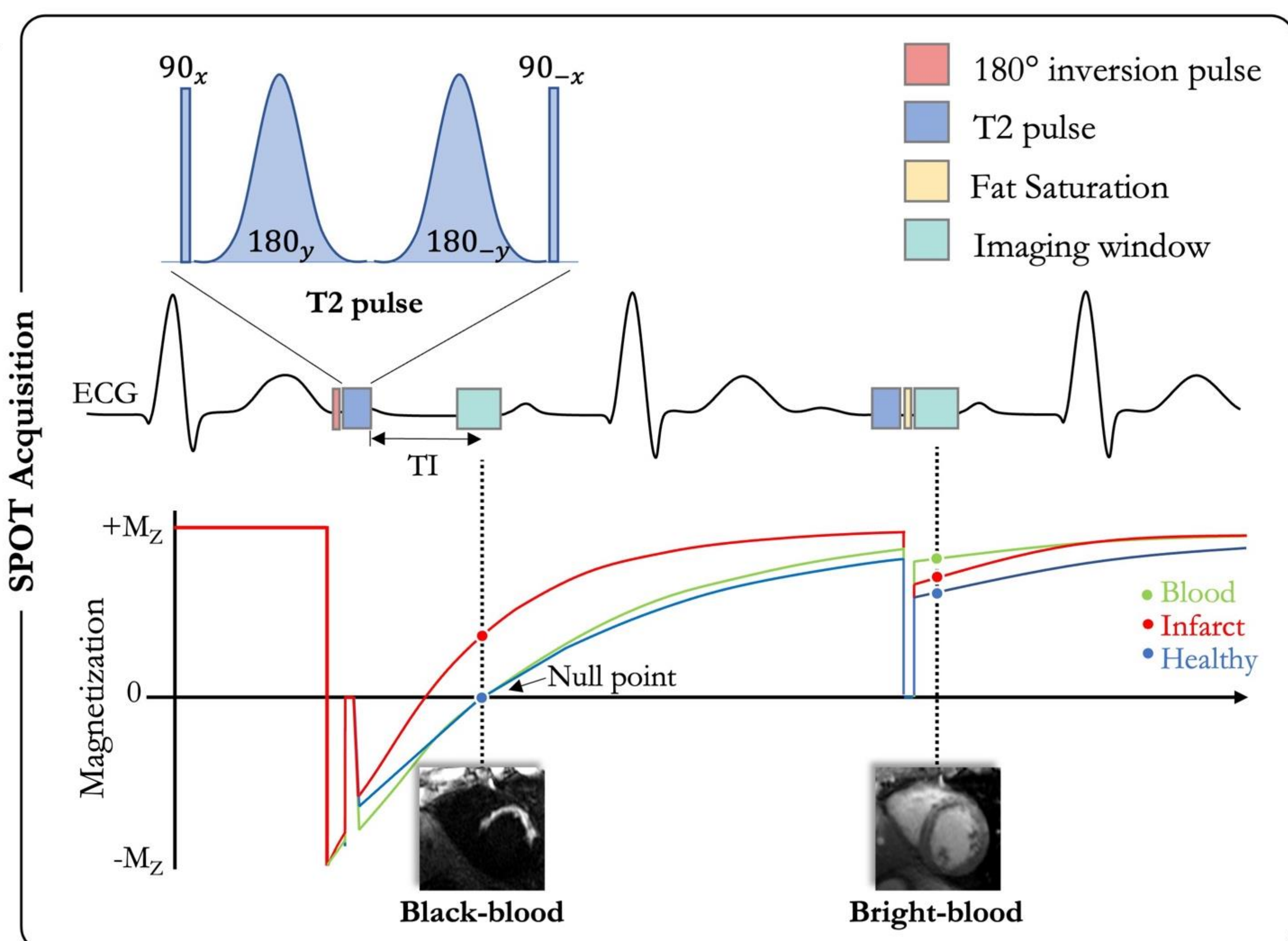
Methods

SPOT

- Even heartbeats: non-selective adiabatic hyperbolic secant (HS) 180° inversion recovery (IR) pulse + adiabatic T2 preparation module (T2p) → black-blood (BL) contrast
- Odd heartbeats: only T2p → bright-blood (BR) contrast

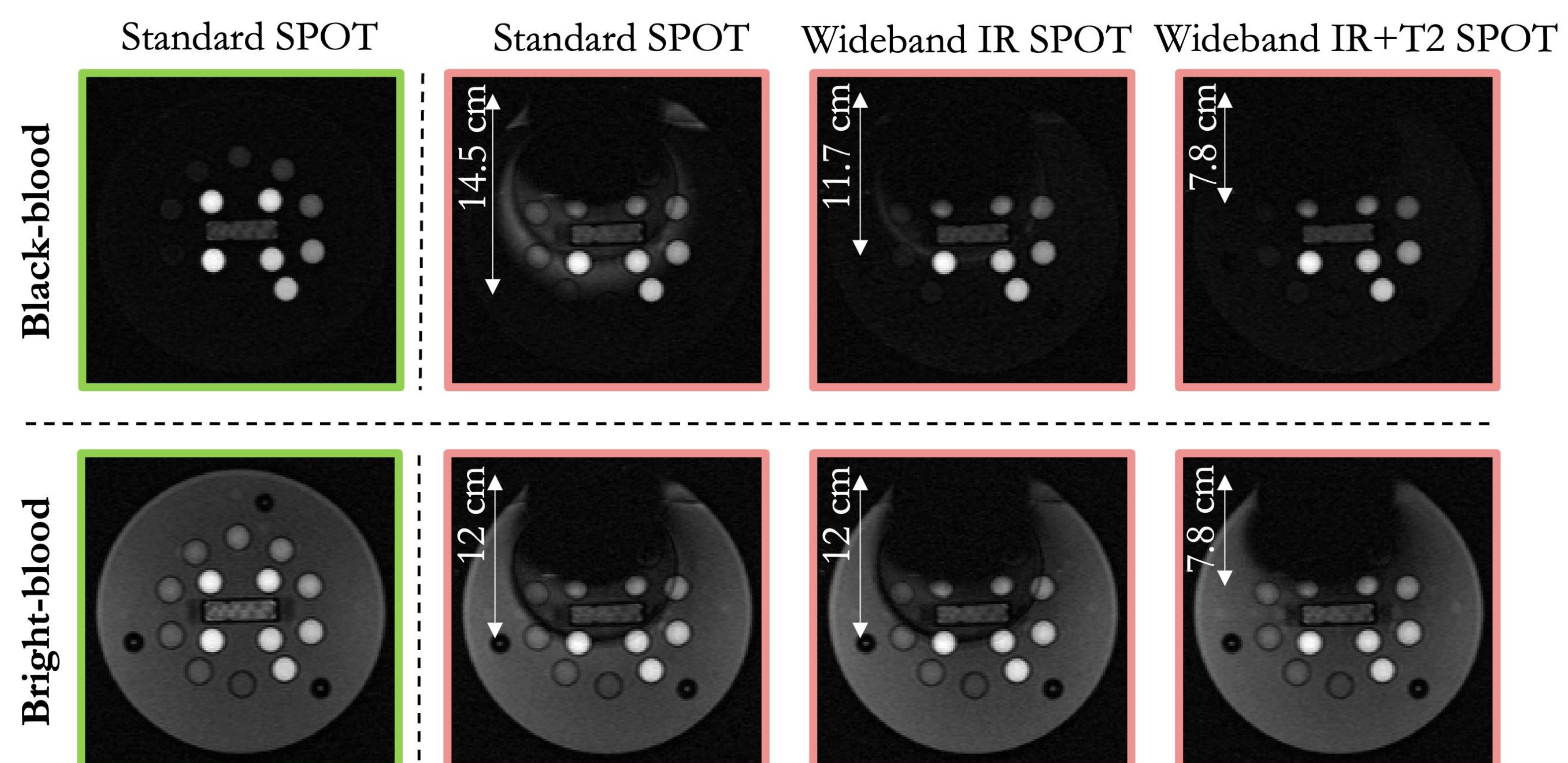
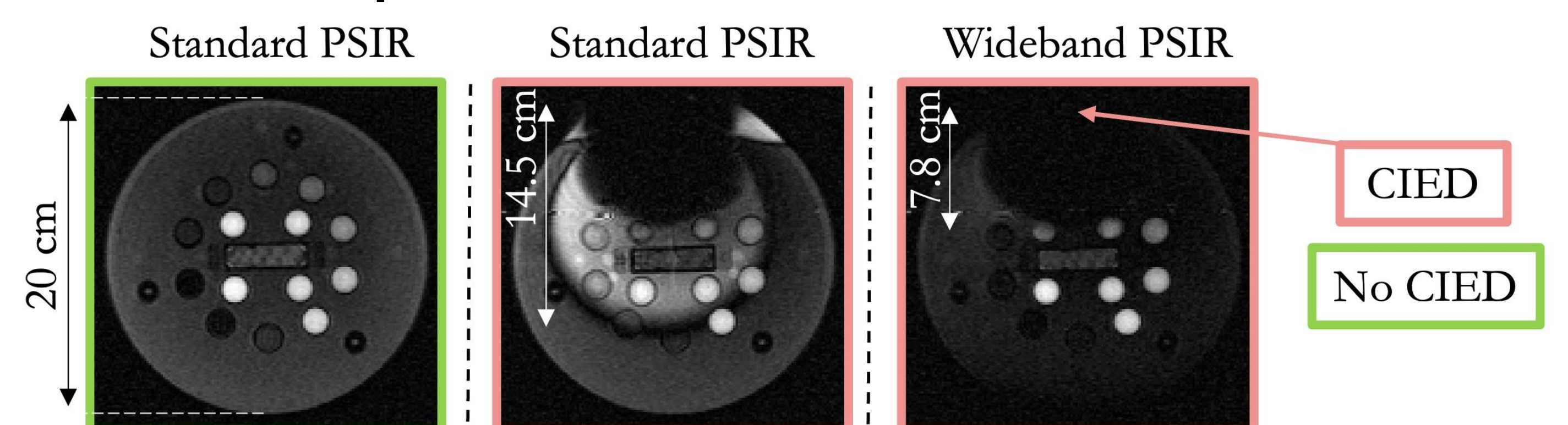
Wideband SPOT

- Wideband IR: IR bandwidth (BW) increased from 0.8 to 9.2kHz
- Wideband T2p: T2p refocusing BW increased from 1.6 to 5kHz

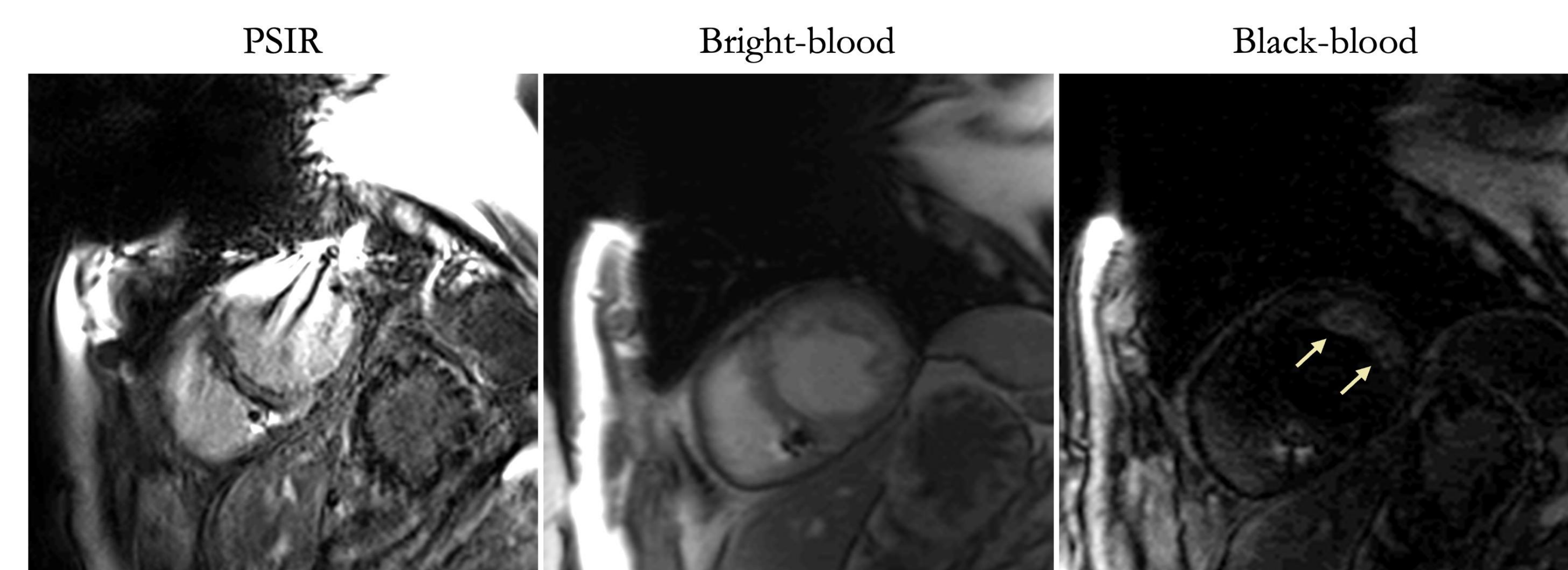


Results

Phantom experiments



In vivo experiments: scar shown by the two arrows



Conclusion

Wideband IR+T2 SPOT

- Hyperintensity and banding artefacts suppressed
- Higher CNR on BR and BL images and higher SNR on BR images compared with conventional PSIR
- Promising technique for scar assessment in patients with CIED, in vivo clinical testing is now warranted

References

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