

# The HYPMED Breast PET/MRI Insert: MRI Compatibility and Comparison to Whole Body PET/MRI

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Commercially available PET/MRI scanners have been designed as whole-body systems. In these, PET spatial resolution and sensitivity are limited. Dedicated PET inserts can potentially overcome these limitations. The EU H2020 project HYPMED developed a local PET insert for a clinical 1.5 T MRI for breast cancer research. The HYPMED insert combines a local MRI receive coil and two PET rings that allow simultaneous imaging of the female breast in prone position in a 1.5 T MRI. The PET system is based on the Hyperion III PET detector platform. Each PET ring has a FOV of approximately 10 cm and a diameter of 20 cm. The detector stacks consist of three-layer LYSO crystal arrays with a pitch of 1.3 mm.

MRI compatibility studies were conducted: The homogeneity of the static magnetic field of the MRI is not significantly deteriorated by the insert and the excitation field B1 is within 84 % and 119 % in the breast area. Clinical routine MRI sequences were tested, and the SNR is comparable to reference scans from a commercial breast coil.

A Jaszczak-like phantom was scanned, both with the breast insert and with a commercial whole-body scanner (Siemens Biograph mMR). Whereas only the 3-mm rods can be seen on the whole-body PET scanner, the HYPMED insert allows to separate the 1.5-mm rods, which clearly demonstrates the advantage in spatial resolution of the dedicated device over the generalized whole-body approach.

## Field

Detectors and electronics

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