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Parallel magnetic resonance imaging of gas-liquid flows CHRISTOPH MUELLER, Laboratory for Energy Science and Engineering, ETH Zurich, ALEXANDER PENN, Laboratory for Energy Science and Engineering, ETH Zurich and Institute for Biomedical Engineering, University and ETH Zurich, KLAAS P. PRUESSMANN, Institute for Biomedical Engineering, University and ETH Zurich — Gas-liquids flows are commonly encountered in nature and industry. Experimental measurements of gas-liquid flows are challenging since such systems can be visually opaque and highly dynamic. Here we report the implementation of advanced magnetic resonance imaging (MRI) strategies allowing us to probe the dynamics (voidage and velocity measurements) of gas-liquid flows with ultra-fast acquisition speeds. Specifically, parallel MRI which exploits the spatial encoding capabilities of multiple receiver coils was implemented. To this end a tailored, 16 channels MR receive array was constructed and employed in the MR acquisition. A magnetic susceptibility matched gas-liquid system was set-up and used to probe the motion, splitting and coalescence of bubbles. The temporal and spatial resolution of our acquired data was 5 ms and 3.5 mm x 3.5 mm, respectively. The total field of view was 200 mm x 200 mm. We will conclude with an outlook of further possible advances in MRI that have the potential to reduce substantially the acquisition time, providing flexible gains in temporal and spatial resolution.

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