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**Techniques and modalities for high resolution imaging and
assessment of skin with high-frequency ultrasound (20 to 100MHz)**

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High-frequency ultrasound (HFUS) in the 20 MHz range is routinely used in dermatological diagnosis for morphological skin imaging in order to support the identification of suspicious skin lesions and to evaluate the success of therapies. In this presentation, technical developments for the utilization of higher ultrasound frequencies in the range up to 100 MHz are presented, which allow for high-resolution imaging and assessment of skin structures with an axial resolution down to 10 μm . Furthermore, a new HFUS system for the assessment of elastic skin properties and quantitative strain imaging with 20 MHz ultrasound is presented as a new imaging modality. Also, a reflection-tomography skin imaging concept was implemented with a 20 MHz ultrasound limited-angle spatial compound system, which allows for multi-directional analysis of backscattered and reflected ultrasound waves from different insonation angles. The proposed techniques and modalities have been evaluated by measurements on phantoms and in vivo. Results show that high-resolution qualitative and quantitative skin assessment methods have been successfully implemented. HFUS based strain imaging enables the non-invasive assessment of skin and lesion properties, and HFUS limited-angle spatial compounding allows for improved skin analysis compared to the conventional linear-scan imaging approach.