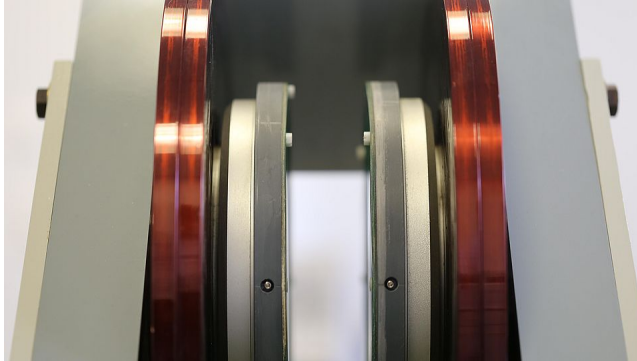


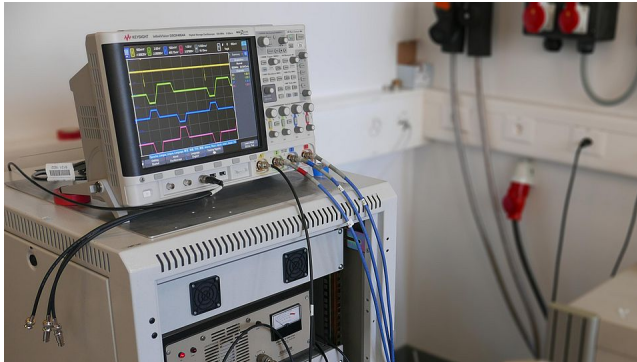
University  
of Basel

Department of  
Biomedical Engineering

# SNSF-Eccellenza Grant: Acute Stroke MRI Exploiting the Physics of Low-field Regimes



Experimental low-field MRI system. (Picture: AMT Center)



Running experiment in the labs of the AMT Center. (Picture: AMT Center)

When stroke strikes, every minute counts. Today, the greatest challenges in the management of stroke patients are 1) to rapidly separate between ischemic and hemorrhagic events which call for completely opposite treatments, and 2) to establish robust new markers of ischemia in the first three hours offering the best patient outcomes, potentially leading to full functional recovery. This project will develop MRI technology tailored to the assessment of acute stroke in the time window 0-3h after onset.

The proposed project comprises three aims that include 1) the development of imaging tools in magnetic fields compatible with mobile and portable designs, 2) the validation of simultaneous multi-parametric imaging that quantifies stroke related metrics, and 3) in vivo investigation of contrast and specificity of low field MRI in acute stroke.

Over the last 30 years, MRI has developed to become the modality of choice in radiology thanks to unmatched contrast and spatial resolution. Yet, due to high costs and siting requirements MRI is less available or flexible than X-ray based or ultrasound (US) imaging. Lowering magnetic fields to envision agile, “point-of-care” devices is a concept that has gained considerable momentum over the last 3 years and yet few of this work reports on imaging performance and focuses predominantly on hardware. The present project proposes to combine synergistically high-performance imaging in low-sensitivity and inhomogeneous regimes with the uncovering of new metrics to quantify the earliest phase of stroke unique to low magnetic field physics.

The expected long term societal and economical outcomes in the context of stroke is a radical improvement of recovery and survival rates in stroke patients from accelerated decision making and future devices sited in the field, reducing drastically the cost of health inherent to stroke patient management.

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