

# TOPICS

Fields of CRNS applications  
Improved understanding of the signal  
Integration of CRNS with hydrological modeling  
Cosmic-ray neutron sensing and lessons from applications  
Development of a strategy for CRNS worldwide  
Design and improvement of neutron detectors  
National and local COSMOS networks  
Links to other communities

## Committee

Sascha Oswald (University of Potsdam)  
Ulrich Schmidt (Heidelberg University)  
Marek Zreda (University of Arizona)

## Local Organizers

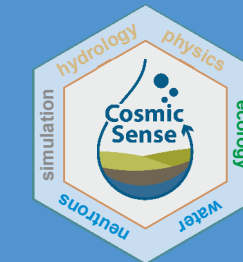
Ulrich Schmidt (Heidelberg University)  
Markus Köhli (Heidelberg University)



# 6<sup>th</sup> international COSMOS workshop

Heidelberg University

October 8<sup>th</sup> - 10<sup>th</sup>, 2020



2020  
October 8-10



Cosmic-Ray Neutron Sensing  
Heidelberg | Germany

# Thursday 08.10.2020

# Friday 09.10.2020

# Saturday 10.10.2020

9:00	<b>COSMOS Workshop Organization Team</b> Opening
9:40	<b>S. OSWALD</b> Cosmic Sense – a joint initiative engaging in interdisciplinary research on hydrological applications of cosmic-ray neutron sensing and its methodological improvements
10:10	<b>D. MCJANNET</b> - invited - An update from down-under – CosmOz: The Australian cosmic-ray soil moisture monitoring network
10:40	<b>K. HERBST</b> SpaceWeather and its impact on the Earth's atmosphere
11:00	<b>C. STEIGIES</b> The not so standard Neutron Monitor
11:40	<b>J. JAKOBI</b> Error estimation for soil moisture measurements with cosmic-ray neutron sensing and implications for rover surveys
12:00	<b>D. RASCHE</b> Combining thermal and epithermal neutron count rates for an improved soil moisture estimation under spatially heterogeneous soil moisture conditions
12:20	<b>V. DÖPPER</b> Mapping soil moisture using Cosmic Ray Neutron Sensing and Sentinel 1, 2 and Landsat 8 TIRS data
13:00	Lunch Break
14:00	<b>M. ZREDA</b> Update on COSMOS and cosmic-ray hydrology
14:30	<b>R. ROSOLEM</b> - invited - What should we do with hundreds of cosmic-ray soil moisture sensors... as a community?
15:00	<b>A. ZIMBAL</b> Neutron measurement and calibration capabilities at the Physikalisch-Technische Bundesanstalt
15:20	<b>L. STEVANATO</b> Local high-energy particles measurements for detecting primary cosmic-ray variations: application for soil moisture estimation
15:40	<b>J. WEIMAR</b> Large-scale boron-lined neutron detection systems as a <sup>3</sup> He alternative for Cosmic Ray Neutron Sensing
16:00	<b>A. RAYMOND</b> Lithium Foil Neutron Detectors
16:50	<b>M. ZREDA</b> - invited - A downward-looking cosmogenic neutron sensor for measuring soil moisture at a horizontal scale of meters
17:20	<b>D. BOORMAN</b> - invited - Establishing a new soil moisture monitoring network for the UK
17:50	<b>U. SCHMIDT</b> Moisture and humidity dependence of the above-ground cosmic-ray neutron intensity
18:10	<b>D. DESILETS</b> Eight fathoms under the SWE: Venturing into deep water with a cosmic ray neutron sensor
19:00	Dinner (Physikalisches Institut)

9:00	<b>R. GUGERLI</b> Continuous and autonomous snow water equivalent measurements by a cosmic ray sensor on a Swiss glacier
9:20	<b>J. WALLBANK</b> Cosmic Sense – a joint initiative engaging in interdisciplinary research on hydrological applications of cosmic-ray neutron sensing and its methodological improvements
9:40	<b>H. BOGENA</b> Cosmic-ray neutron sensing based monitoring of snowpack dynamics: A comparison of four conversion methods
10:00	<b>P. SCHATAN</b> Sensing Area-Average Snow Water Equivalent with Cosmic Ray Neutrons in Alpine Terrain
10:40	<b>M. HEISTERMANN</b> Space-time soil moisture retrieval at the catchment scale using a dense network of cosmic-ray neutron sensors
11:00	<b>S. ZACHARIAS</b> Harmonizing the international environmental research infrastructure landscape – a chance for Cosmic-Ray Neutron Sensing
11:20	<b>P. NEY</b> From Sensor to Real-Time Forecasts: Setup of a Cosmic-Ray Neutron Sensor Network for Data Assimilation and Optimization of High-Resolution Real-Time Predictions of Soil Moisture
12:00	<b>J. IWEMA</b> Mapping Soil Moisture using CRNS and Sentinel 1,2 and Landsat 8 TIRS data
12:20	<b>R. BAATZ</b> Data-driven scaling approaches for soil moisture sensing with cosmic ray neutron probes
12:40	<b>M. BACAK</b> Uncertainty quantification of soil moisture predictions
13:00	Lunch Break
14:00	<b>M. SCHRÖN</b> Mobile Platforms for Soil and Snow Water Mapping Across Scales with Cosmic-Ray Neutrons
14:20	<b>G. BARONI</b> Application-driven developments of cosmic-ray neutron sensing open the path to wider and new uses: the cases of agricultural water management and pipe leakages
14:40	<b>A. PATIL</b> Cosmic Ray Neutron Sensing: Improved field-scale soil moisture estimation by assimilation in land surface model
15:00	<b>D. ZUMR</b> Foreseen potential of CRNS for better understanding of catchment runoff dynamic
15:20	<b>K. DIMITROVA PETROVA</b> Opportunities and challenges in obtaining catchment-scale representative soil storage estimates from Cosmic Ray Neutron Sensors and their use in rainfall-runoff modelling
15:40	<b>H. COOPER</b> COSMOS-UK: Near real time soil and hydrometeorology data
16:00	<b>H. AHMED</b> Evaluation of Soil Moisture from Temperate and Semiarid Environments Using Cosmic-Ray Neutron Sensors and Sentinel-1 Data
17:00	<b>T. FRANZ</b> - invited - Opportunities and challenges towards integration of hydrogeophysical sensors in agriculture
17:30	
19:30	Conference Dinner (Kulturbrauerei)

10:00	<b>M. KÖHLI</b> URANOS - modeling cosmic-ray neutron transport
10:20	<b>M. SCHRÖN</b> Cornish Pasty – COsmic-Ray Neutron flavored Processing and Analysis of Sensor Data in pYthon
10:40	<b>D. POWER</b> Cosmic-Ray Sensor Python tool (crspy): a python tool for harmonized processing of CRS data for global analysis
11:00	<b>T. SATO</b> Features of PARMA: PHITS-based Analytical Radiation Model in the Atmosphere
12:00	<b>J. WEIMAR</b> MCNP6 and its galactic cosmic-ray source: A study about the production and propagation of cosmic ray neutrons in the Earth's atmosphere and what we may infer with respect to cosmic-ray neutron sensing
12:20	<b>T. BRALL</b> Assessment of secondary neutron characteristics from galactic cosmic rays at mountain altitudes with Geant4 simulations and ground-based measurements of neutron energy spectra
13:00	Lunch Break
14:00	Hiking Excursion
	<b>Thursday Poster Session</b>
17:30	<b>B. O. VEGA CABRERA</b> On the possibilities of CR-39 and LR-115 nuclear track detectors as soil moisture sensors using isotopic neutron sources
17:35	<b>L. SCHEIFFELE</b> How cosmogenic neutron derived soil moisture can be used to estimate dynamic groundwater recharge rates at the field scale
17:40	<b>Z. SANCHEZ-MEJIA</b> Soil moisture observations: CRNS vs TDR-profile in a flooded agriculture regime at the Yaqui Valley
17:45	<b>E. NIXDORF</b> Applicability of machine learning-based approaches to predict CRNS Roving-derived soil moisture estimates on the catchment scale
17:50	<b>M. SCHRÖN</b> How to correct near-surface neutron measurements for incoming cosmic-ray fluxes?
17:55	<b>H. BOGENA</b> Establishing a European COSMOS network in the light of continental drought events
18:00	<b>M. B. DUYGU</b> Examining the relationship between CRNP soil moisture data and GLDAS based Noah LSM Evapotranspiration product
18:05	<b>B. BRAUNEIS</b> Event identification electronics for neutron proportional counters
18:10	<b>M. JANKE</b> Large-Scale Boron-Lined Neutron Detection Systems as a cost-efficient solution for Cosmic-Ray Neutron Sensing