

British Astronomical Association  
RADIO ASTRONOMY SECTION

# RAG21

Saturday 16<sup>th</sup> October 2021

10:00 – 17:00 BST

## **The Black Hole and Star Formation History of the Universe - with a radio flavour**

Prof Ian McHardy (Southampton)

The two processes which dominate the appearance of our universe are star-formation and accretion (mainly onto black holes). Star-formation is fundamental to the formation and evolution of galaxies whilst accretion provides a major power source in the universe. The feedback between these two processes is also crucial. We will look at some of the details of these processes and how their importance has changed throughout the life of the universe. Radio observations provide a particularly useful diagnostic as radio waves are not obscured by dust and so we will discuss some of the results from two major radio surveys made by the SKA-pathfinder, eMERLIN, ie the LeMMINGS survey of nearby galaxies and the eMERGE cosmological deep survey.

## **The counting of muons**

Dr Spencer Axani  
(MIT CosmicWatch)

Cosmic ray muons carry a rich amount of physics that is now easily accessible to citizen and amateur scientists. The CosmicWatch Desktop Muon Detector is an MIT-based physics project that aims to enable a broad audience to work with particle detectors, while also incorporating various aspects of electronics-shop and machine-shop technical development. This talk will focus on the technical aspects of particle detection principles and the detectors themselves, as well as how they can be used to explore the exciting field of astro/particle physics.

## **Introduction to a new Radio Meteor Detecting Software and its application in the Study of Head Echoes**

Dr Wolfgang Kaufmann

Counting of radio meteors is a delightful occupation. However, the reflected signals contain much more information. To reveal it a fast numerical recording is necessary. The gained numerical data allow for an immediate processing at any time with any software. This talk presents a python script that analyses the audio stream fed from a radio, detects the radio meteor signal and records it in steps of about 11 ms. A second python script picks up these data and process them for different analysis purposes. Both scripts are free for download. With this software meteor head echoes were recorded and analysed. One aim was to identify meteor streams within sporadic meteors. The second goal was to approve the well-known existence of different sources of sporadic meteors in the sky and study their structure in time and space.

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**Schumann Resonance Sensor - our journey to first light**

Norman Pomfret

In this presentation, I discuss the origins of Schumann+ resonance, its discovery and illustrate what it is and its causation. Then I explain our project plan and the hardware required, its development and testing. Finally, the captured Schumann Resonance signal is presented, together with our thoughts for improved digital signal processing (DSP). Laurence Newell is my fellow traveller on this journey of discovery or perhaps re-enactment.

**Observing the First Stars with Radio Arrays**

Dr Emma Chapman  
(Imperial, London)

The Epoch of Reionization (EoR) signals the end of the Dark Ages of the Universe and the birth of the first stars. The aim for a current generation set of radio arrays is to make the first statistical detection of this epoch. The Galactic foregrounds cover the cosmological data by several orders of magnitude however, and their removal remains a significant challenge. I will speak broadly about the current state of the field, and why I have just joined the BAA-RAG!

**POSTERS**

**Using the Raspberry Pi for meteor observing**

Phil Rourke

**A Magnetic Field Sensor in my All Sky Camera**

Tony Abbey

**Radio observation of super nova SN2017EAW**

Diane Swan

**A First Hydrogen Line Radio Telescope**

Peter East

**Endeavours with muon counting**

Paul Hearn

**A UK meteor beacon at 50 MHz**

Brian Coleman

**VLF and magnetometry observations in lockdown**

John Cook