

How Did Our Universe Get Here? Studying the First Galaxies and the Beginning of the Universe with Intensity Mapping Simulations

PHYSICS COLLOQUIUM

OUR UNDERSTANDING OF THE PROPERTIES OF THE FIRST GALAXIES AND HOW THEY AFFECT THE SURROUNDING UNIVERSE IS STILL INCOMPLETE. WHEN THE FIRST GALAXIES FORMED, THEY EMITTED ULTRAVIOLET RADIATION WHICH IONIZED THE HYDROGEN IN THE INTERGALACTIC MEDIUM (IGM), TRANSFORMING THE UNIVERSE INTO WHAT WE SEE TODAY. HOWEVER, THE TIMING AND STRUCTURE OF THIS TRANSITION, KNOWN AS COSMIC REIONIZATION, IS POORLY UNDERSTOOD. INTENSITY MAPPING IS A PROMISING NEW TECHNIQUE THAT CAN BE USED TO PROBE COSMIC REIONIZATION BY CONSTRUCTING LARGE-SCALE, THREE-DIMENSIONAL MAPS OF SPECTRAL LINE EMISSION FROM GALAXIES AND THE IGM. IN THIS TALK, I WILL DISCUSS SIMULATIONS OF THESE INTENSITY MAPS, WHICH CAN BE USED TO CONSTRAIN REIONIZATION AND THE PROPERTIES OF THE FIRST GALAXIES, AS WELL AS MAKE PROJECTIONS FOR THE SPECTRO-PHOTOMETER FOR THE HISTORY OF THE UNIVERSE, EPOCH OF REIONIZATION AND ICES EXPLORER (SPHEREX) AND FUTURE TELESCOPES SUCH AS THE COSMIC DAWN INTENSITY MAPPER (CDIM).



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WOOSTER
Physics