Saal: 2501 | Project | 16:00 | 01:00 | Day: 5 | Track: Science | nA

Title: **Detecting echoes from the dawn of time**

Subtitle: Nifty technologies behind the world's most sensitive astronomical detectors

Speaker: **Liz**

Short: *Our understanding of the universe has exploded in the past 50 years, largely thanks to incredible advances in detector technology that allow us to precisely measure light and particles of all kinds. In this talk, I will describe some of the world's most sensitive detector technologies. These detectors often exploit strange properties of matter, or push up against the laws of physics in the most extreme physical conditions. I will also highlight the scientific discoveries that these new technologies have made possible.*

Long: Almost every great leap in understanding in science was made possible by a new technology. For example, the field of biology changed forever after the microscope revealed the existence of cells. In this talk I hope to convey some of the great technological leaps in technology in astronomy, and what those leaps have allowed us to learn about the nature of the universe. A small sampling of what you can expect to hear about is listed below. My own PhD research was focused on the cosmic microwave background (remnant radiation from the big bang), which is best viewed with mm-wavelength detectors. This wavelength range is notoriously difficult to work in, and we have to operate our superconducting detectors a mere .25 degrees above absolute zero. Other experiments aim to measure neutrinos, which are particles that almost never interact with anything. But how do you measure something that only interacts rarely with your detector? One experiment's solution is to use a several cubic kilometer slab of the Antarctic ice cap as a the detector– the "just make it bigger" approach. In practice, there are always problems that crop up when working at the edges of human understanding and the laws of physics, some fundamental, and some mundane but hilarious. (Like the time all of our resistors went superconducting on us; Digikey doesn't spec resistors to temperatures within a degree of absolute zero.) I plan to discuss some of the practical problems we have had to tackle when working on cryogenics and detectors, and the sometimes unorthodox ways we have solved them. Cryogenic dental floss anyone?