

## **Phosphor-SAD: A Novel Approach to Solve RNA Structure**

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The importance of RNA three-dimensional structure has been recognized with crystal structure determinations of ribozymes, riboswitches, and the whole ribosome. Hence, RNA crystallography plays an emerging role in modern structural biology. However, because of limitation in effective derivatization and anomalous scatterer incorporation, phasing RNA structure is not well established. We propose phosphor single-wavelength anomalous dispersion (P-SAD) as a general approach to solve RNA structure. Due to weak anomalous signal of phosphor, x-ray diffraction data collection, processing and phasing methodology need to be optimized and further developed. With collaboration from groups in Switzerland and France, we are exploring the potential of macromolecular beamlines at Swiss Light Source (SLS) to accurately measure weak anomalous diffraction from various RNA crystals. The first successful phasing of a RNA molecule (Sarcin Ricin Loop of 27 nucleotides) by P-SAD will be presented. The strategies for sub-structure determination and subsequent phasing procedure will be discussed, as well as the potential and limitation of P-SAD phasing for even larger nucleic acid structures.