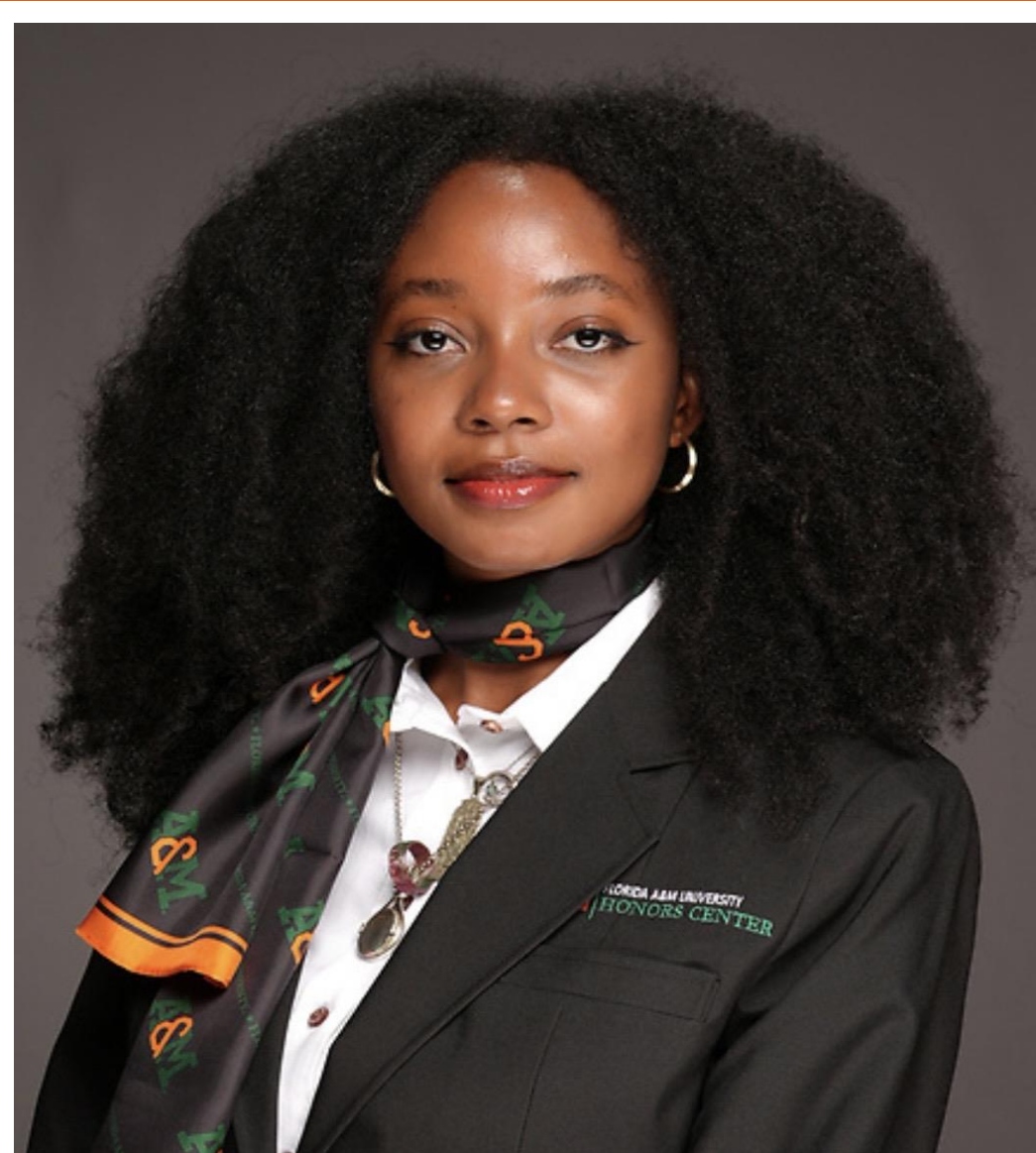




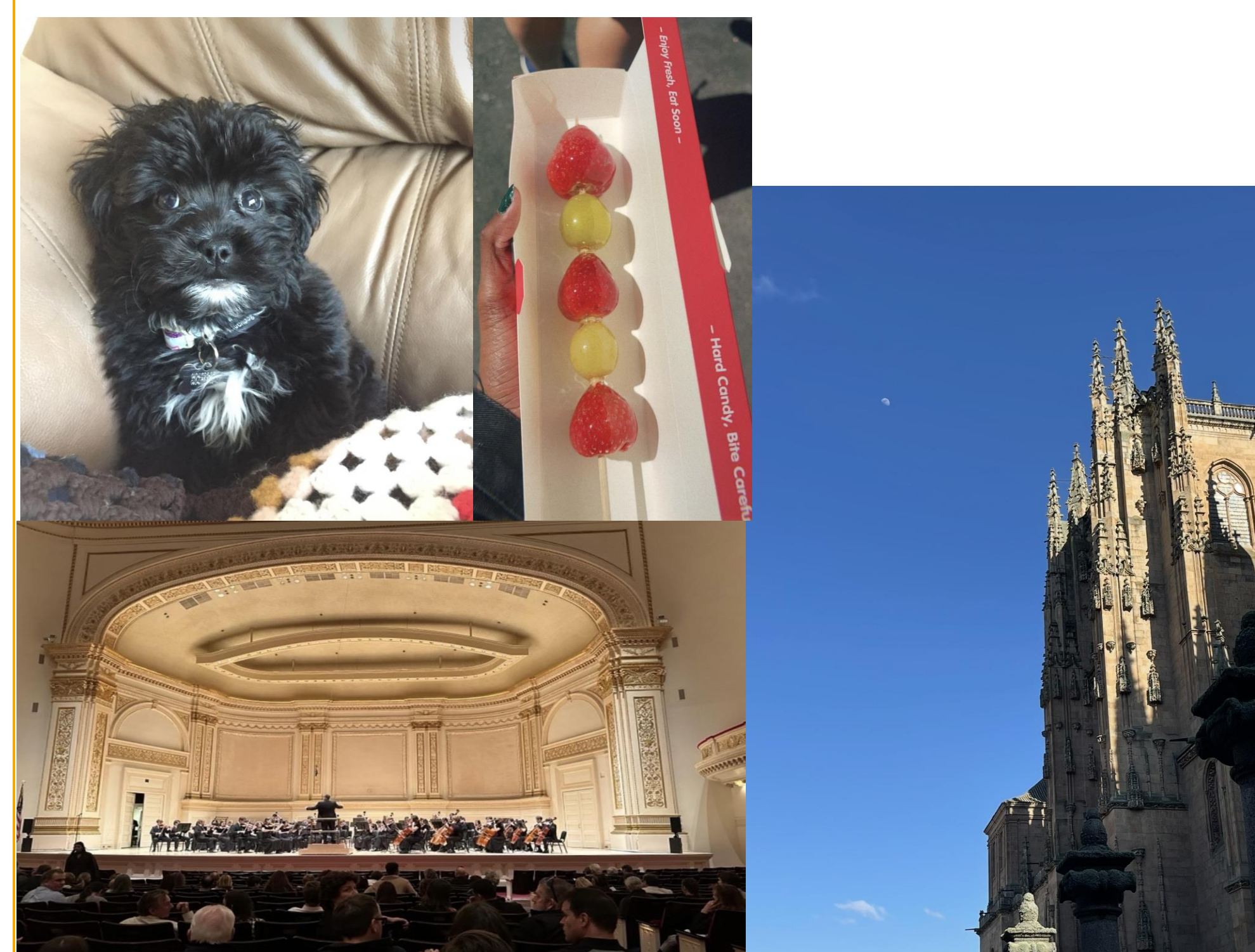
Time-Resolved LIBS Analysis of Aluminum and Cerium Oxide Mixtures for Plasma Temperature Estimation Using Boltzmann Method

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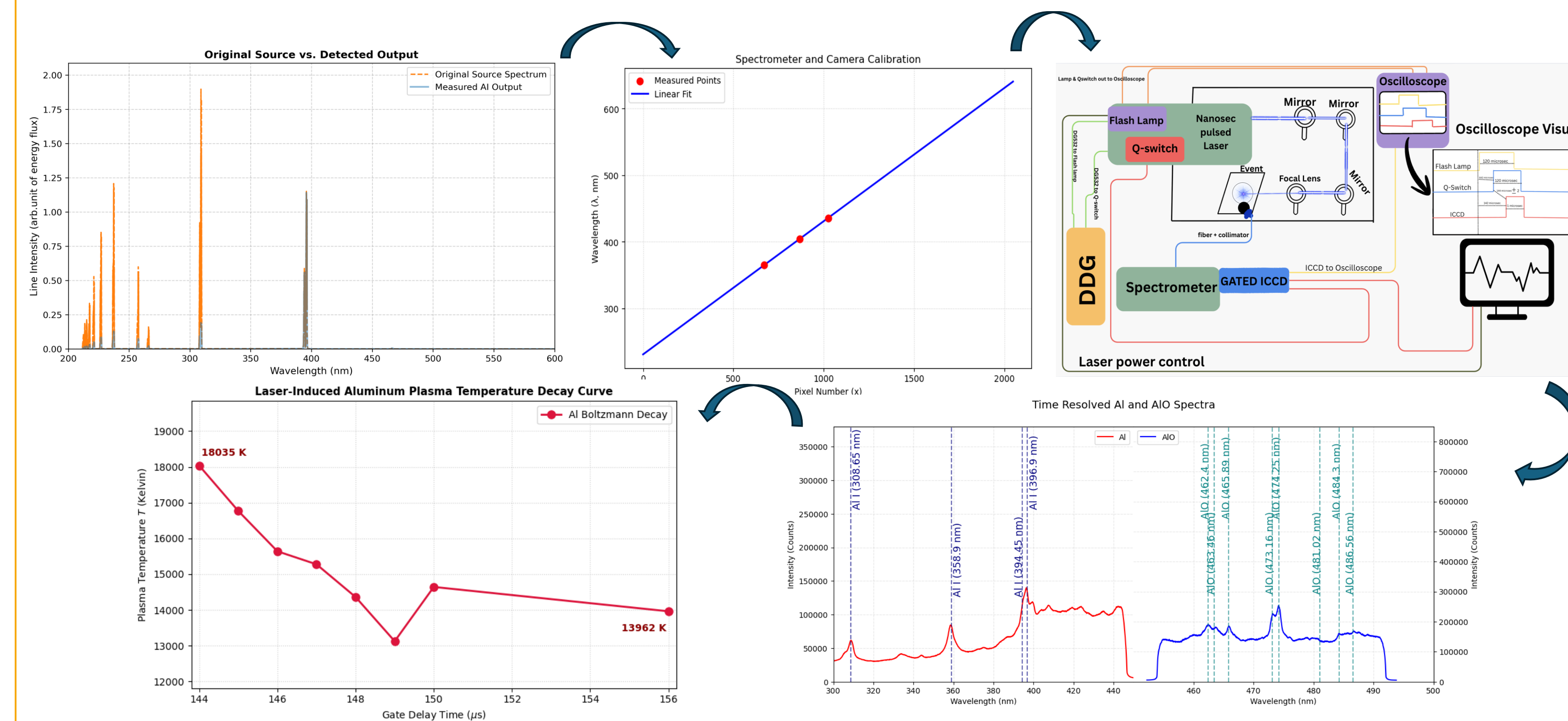
ABOUT ME

- **Majors:** Physics and Mathematics Double Major
- **Career Goals:** I aim to get more insight into more specific research areas of physics, as well as strengthen my own research and presentation skills. I hope within my career I become a research physicist that combines the studies of particle and quantum physics with environmental sciences
- I chose LLNL for its vast research opportunities, networking potential, and various interconnected research fields
- **Interests:** Food/Baking, Orchestra, Traveling, Animals



SUMMER RESEARCH

- **Abstract:** In this work, we utilized Time-Resolved Laser-Induced Breakdown Spectroscopy (LIBS) and the Two-Line Boltzmann method to estimate the plasma temperature of aluminum (Al) foil and CeO_2CaCl over time. This research aims to gain deeper insights into thermodynamic properties and chemical speciation as the plasma cools.
- **Methods:** We first calibrated the detector system, the spectrometer and gated ICCD camera, using a Newport HgNe lamp. A nanosecond pulsed Q-Switched Nd:YAG laser was then focused onto an aluminum foil target to generate plasma. We measured the emission spectra with a fiber optic and our detector system. The measured emission lines for Al I was used to estimate the plasma temperatures using the Two-Line Boltzmann equation with NIST atomic database values.
- **Results:** We successfully identified atomic Al and molecular AlO emission lines from the time resolved data, showing that molecular AlO forms during the later plasma cooling stages as it interacts with oxygen. The emission lines for Al I were used to calculate the plasma temperature, and shows a measurable decrease over time as the plasma cools.



LLF AWARD

- My LLF award supported my living expenses by covering my commute, groceries, and have also helped towards paying for my university, as well as the summer classes I have been taking
- This fellowship has provided me with opportunities, resources and ideas that will advance my professional career as a research physicist. It has also provided a way to make meaningful connections that will further engage me inside and outside of my professional advancement



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