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Upgrading the ATLAS tune archiving system

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The Argonne Tandem Linear Accelerating System (ATLAS) is a U.S. DOE national user facility that delivers stable and radioactive ion beams from hydrogen to uranium for low-energy nuclear physics research [1]. Operators routinely expedite setup by restoring previously optimized machine parameters sets ("tunes"). The legacy tune archiving system, implemented in Corel Paradox (1999), has become a maintenance and operational bottleneck due to recurrent table corruption, single-user access, limited integration, and proprietary language.

We present the ATLAS Time Machine (ATM), a modern replacement comprised of PySide6 for the UI, FastAPI for backend services, MariaDB for experiment metadata, and InfluxDB v2 for time-series device data. ATM supports multi-user access, direct integration with the ATLAS control system, and automated beamline-aware data collection based on a dynamically generated beam path view. Initial results from beta operations indicate improved reliability, streamline operator workflows, and more convenient operator access. We conclude with lessons learned and a roadmap toward full production deployment.

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Footnotes

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