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Status update of the SASE3 variable polarization project at the European XFEL

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The SASE3 Variable Polarization project is intended to offer the polarization control of the soft X-ray FEL pulses. The project was completed in early 2022. During the winter shutdown 2021-2022, all four APPLE-X helical undulators were placed in the tunnel and the first lasing was achieved in April 2022. Unfortunately, further use of the helical afterburner proved impossible, as the encoders used to position the magnetic structures of the undulator and thus set the K parameter and polarization mode were damaged by radiation. To carry out the repair work, all undulators were removed from the tunnel in the summer of 2022. Meanwhile, investigations have been carried out to determine the causes of the radiation damage. This article presents measures to minimize further radiation damage in order to ensure the continued operation of the helical afterburner, as well as the current status of the project.

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