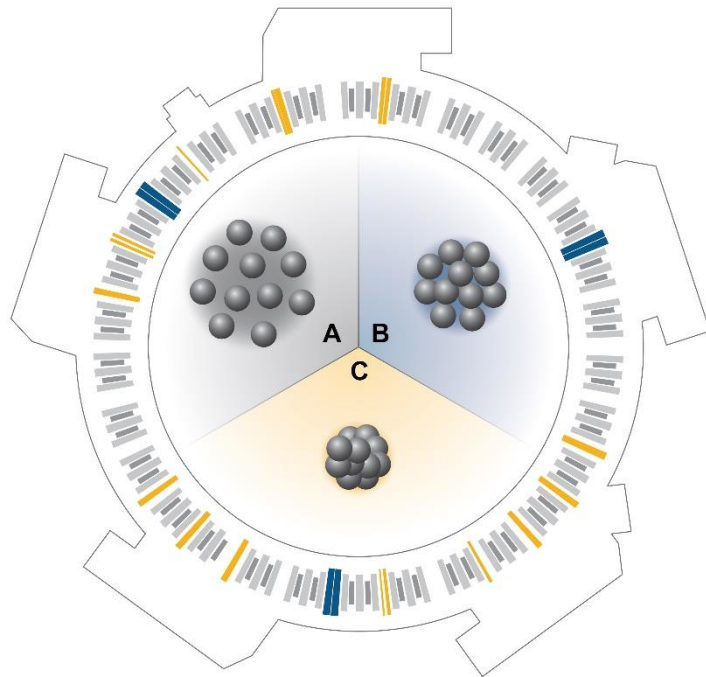


Optimizing the NSLS-II Beam Parameters



Three different lattice versions and corresponding beam sizes at NSLS-II: A) magnet optics (gray), B) with damping wigglers (blue), and C) with all insertion devices (yellow).

V. Smaluk, Y. Li, Y. Hidaka, T. Tanabe, O. Chubar, L. Wiegart, A. Blednykh, B. Bacha, T. Shaftan. *Phys. Rev. Accel. Beams* **22**, 124001.

Work was performed in part at Brookhaven National Laboratory

Scientific Achievement

Scientists studied three essential beam parameters of the NSLS-II storage ring.

Significance and Impact

To ensure high beam quality for users at a synchrotron light source, scientists need to measure, model, and optimize the main beam parameters of the accelerator.

Research Details

- 3 beam parameters (emittance, radiation energy loss, and energy spread) were simulated.
- The same parameters were measured using NSLS-II optical diagnostics and the CHX beamline.
- The emittance in configuration C) was the lowest.
- As the facility has built more beamlines, the emittance was reduced and the x-ray brightness increased.
- Careful calibration of the machine model and measurements of beam parameters are necessary to ensure the light source's highest level of performance.