

Xunyang Hong

R&D | Scientific software | Instrumentation

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Portfolio: xhong.net

Profile

Physics PhD candidate specializing in X-ray scattering, scientific software development and instrumentation. Experience in synchrotron experiments, quantitative analysis and laboratory automation.

Technical strengths

Software Python; MATLAB; Codex; Claude Code

Instrumentation Laue diffraction; robot-assisted crystal alignment; closed-loop control.

Methods Resonant inelastic X-ray scattering (RIXS); X-ray diffraction (XRD); Feynman-diagram computations.

Research & development experience

Doctoral Researcher – Physics

Mar. 2023 – present

University of Zurich, Switzerland

- Investigated quantum materials using X-ray spectroscopy and diffraction, contributing to 20+ experimental campaigns at four synchrotron facilities.
- Applied spectral analysis and numerical modelling to separate overlapping signals and extract material parameters from experimental data.
- Identified and corrected an inherited numerical-analysis error and verified its effect on the research conclusions.
- Developed two scientific software packages, including an open-source Python package distributed through PyPI.

Research output: Three first-author scientific papers.

Selected development projects

Automated Laue crystal alignment

Jun. 2025 – Jun. 2026

Hardware integration / Robotics | [Project & demos](#)

- Integrated a Laue diffraction source and detector, a Meca500 robot arm and imaging cameras within a unified graphical user interface (GUI).
- Developed a closed-loop control algorithm to automatically align crystals for x-ray diffraction experiments. Alignment accuracy reached 0.5° .

ADVISOR scientific-analysis software

Oct. 2024 – present

X-ray scattering toolbox | [Demo](#) · [PyPI](#) · [Documentation](#)

- Implemented scattering-angle/HKL conversions, scattering-geometry visualization and structure-factor calculations with CIF file support.
- Released the open-source package on PyPI.

Education

PhD in Physics – in progress | degree expected in Mar. 2027.

Mar. 2023 – present

University of Zurich, Switzerland

Master in Physics

Sept. 2020 – Mar. 2023

ETH Zurich, Switzerland

Bachelor in Physics

Sept. 2016 – Sept. 2020

Sun Yat-sen University, China

Selected publications

X. Hong et al., “Unveiling the nature of collective charge excitations in a cuprate superconductor.” *The Innovation Physics* **1**, 100011 (2026). DOI; [arXiv:2503.04334](#).

X. Hong et al., “Impact of Electron Correlations on Infinite-Layer Cuprates and Nickelates.” *Communications Materials* **7**, 182 (2026). DOI; [arXiv:2511.09460](#).

Teaching, languages & practical details

Teaching 440+ hours of teaching assistance experience in physics and programming.

Languages English: professional; German: A2; Madarin, Cantonese: native.

Graphic design Basic proficiency in digital graphic design and hand-drawn illustrations.

Availability Start date: 15 Mar. 2027; Working permit needed; preferred location, Switzerland.