Dimitar Popmintchev

Born	Kazanlak, Bulgaria 1980
Alma mater	Sofia University (BS) Boston College (MSc) University of Colorado Boulder (PhD, 2017)
Thesis	Quantum and Extreme Nonlinear Optics: Design of Coherent Ultrafast X-ray Light and Application (2017)
Known for	EUV–X-ray lasers High-harmonic generation Attosecond and zeptosecond X-ray pulses
Scientific career	
Fields	Physics Atomic, Molecular, and Optical Physics Ultrafast Lasers Coherent X-ray Science

Doctoral advisor	Margaret Murnane and Henry Kapteyn

Dimitar Popmintchev (Димитър Попминчев) is a Bulgarian-American physicist specializing in ultrafast lasers and coherent EUV–X-ray science. He is the Laboratory Manager at Popmintchev LABS within the Photonics Institute at TU Wien (Technical University of Vienna) in Austria, where he leads research on quantum X-ray technology.[1][2] Popmintchev is known for his pioneering work in developing tabletop X-ray lasers capable of generating coherent extreme ultraviolet (EUV) and soft-to-hard X-rays, enabling attosecond imaging of quantum systems.[3][4]

His research has applications in imaging advanced quantum materials, EUV lithography metrology, and ultrafast spectroscopies, pushing the boundaries from attosecond to zeptosecond timescales.[5][2]

Early life and education

Popmintchev was born in Bulgaria 1980. He earned his undergraduate degree (BS) in Physics from Sofia University, followed by an MSc in Physics from Boston College. He received his Ph.D. in Physics from the University of Colorado at Boulder in 2017, with a thesis titled 'Quantum and Extreme Nonlinear Optics: Design of Coherent Ultrafast X-ray Light and Application'.[6]

Career

Following his Ph.D., Popmintchev served as a postdoctoral scientist at JILA, a joint institute between the University of Colorado Boulder and the National Institute of Standards and Technology (NIST). During this time, he worked with leading researchers such as Prof. Margaret Murnane and Prof. Henry Kapteyn on advancements in high-harmonic generation and X-ray sources.[3]

He joined TU Wien around 2019 as Laboratory Manager for Popmintchev LABS, with adjunct affiliations at the University of California, San Diego. Popmintchev maintains an active presence on professional networks, including LinkedIn, ResearchGate, and X.[7][5]

Research

Popmintchev's research centers on quantum X-ray science and technology, including the development of coherent X-ray sources with tunable classical and quantum properties for ultrafast imaging and spectroscopies of atomic, molecular systems, and quantum nanomaterials.[2] Key areas include:

- **High-Harmonic Generation (HHG)**: Pioneering work on generating bright coherent ultrahigh harmonics in the keV X-ray regime using mid-infrared femtosecond lasers.[3]
- **Tabletop EUV–X-ray Lasers**: Developing compact, aberration-free spectrometers and monochromators for EUV-soft X-ray applications.[1]

coherent diffractive imaging.[1]

His laboratories focus on X-ray combs for ultrafast imaging, quantum design of coherent X-rays, and the zeptosecond hard X-ray frontier.[2][9] Popmintchev has co-authored over 80 publications in peer-reviewed journals, with an h-index of 28 and over 4,150 citations.

Publications

His work has appeared in journals such as *Science*, *Nature Photonics*, and *Proceedings of the National Academy of Sciences*. Notable co-authored publications include:

- T. Popmintchev, M.-C. Chen, D. Popmintchev, P. Arpin, S. Brown, et al. "Bright coherent ultrahigh harmonics in the keV x-ray regime from mid-infrared femtosecond lasers." *Science*, 336(6086), 1287-1291 (2012). doi:10.1126/science.1218497.
- D. Popmintchev, B. R. Galloway, M.-C. Chen, F. Dollar, et al. "Near- and Extended-Edge X-Ray-Absorption Fine-Structure Spectroscopy Using Ultrafast Coherent High-Order Harmonic Supercontinua." *Physical Review Letters*, 120(9), 093002 (2018). doi:10.1103/PhysRevLett.120.093002.
- O. Kfir, P. Grychtol, E. Turgut, R. Knut, D. Zusin, D. Popmintchev, et al. "Generation of bright phase-matched circularly-polarized extreme ultraviolet high harmonics." *Nature Photonics*, 9, 99-105 (2015). doi:10.1038/nphoton.2014.293.

References

1. "Team - Popmintchev LABS". *tuwien.at*. Retrieved 2026-01-25.
2. "TEAM – PopmintchevLABS". *popmintchev.ucsd.edu*. Retrieved 2026-01-25.
3. "Dimitar Popmintchev - Google Scholar". *scholar.google.com*. Retrieved 2026-01-25.
4. "How to make zeptosecond X-ray pulses". *Physics World*. 2013-07-29. Retrieved 2026-01-25.
5. "Dimitar Popmintchev". *ResearchGate*. Retrieved 2026-01-25.
6. Popmintchev, Dimitar (2017). *Quantum and Extreme Nonlinear Optics: Design of Coherent Ultrafast X-ray Light and Application* (Ph.D. thesis). University of Colorado Boulder.
7. "Dimitar Popmintchev - TU Wien". *LinkedIn*. Retrieved 2026-01-25.
8. "Dimitar Popmintchev - INSPIRE". *inspirehep.net*. Retrieved 2026-01-25.
9. "Let There Be Light: Designing Popmintchev LABS at UCSD". *Lab Manager*. 2020-09-01. Retrieved 2026-01-25.

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