

Emrah Turgut

CONTACT INFORMATION

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QUALIFICATIONS AND INTERESTS

Ultrafast Electron Dynamics in Ferromagnetic Systems, Magnetic Multilayer Systems, High Harmonic Generation, Coherent Tabletop X-ray Sources, Coherent Diffraction Imaging, X-ray Magnetic Diffraction Imaging

EDUCATION

University of Colorado, Boulder, USA

Ph.D., Physics

09/2009 – present

- Thesis Topic: Ultrafast Magnetization Dynamics in Magnetic Multilayer by Extreme Ultraviolet Light
- Advisors: Margaret M. Murnane, Henry C. Kapteyn, Thomas J. Silva
- CGPA: 3.80/4.00
- Expected graduation date: May 2014

Middle East Technical University, Ankara, Turkey B.S., Physics

09/2005 – 06/2009

- CGPA: 3.85/4.00
 - Specialization Area: Opto-electronics
 - Senior Project: Distortion of terahertz pulses in electro-optic sampling, Hakan Altan's group
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PROJECTS

- Proving that probing ultrafast magnetization dynamics with high-harmonic generation is a perfect tool on a table top without electronic artifact.
 - Probing exchange interaction between Fe and Ni in Ni-Fe alloys and controlling this exchange energy by diluting the alloys via Cu.
 - First demonstration of ultrafast magnetization enhancement in magnetic multilayers with superdiffusive spin currents.
 - Controlling the contributions of spin-flip scattering and superdiffusive spin currents during ultrafast magnetization dynamics in multilayers.
 - Generation of bright circularly polarized high-harmonics on a table top and demonstration of x-ray magnetic circular dichroism with high-harmonic generation.
 - Modification of electronic configuration of Ni-Fe alloys by diluting Cu using XMCD.
 - Investigation on modification of electronic configuration during ultrafast demagnetization in Co.
 - Ultrafast remagnetization and demagnetization of FeRh.
 - A non-destructive approach to the characterization of ultrathin films with extreme-ultraviolet photons.
 - Time-resolved magnetic imaging by coherent diffraction imaging.
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ACADEMIC EXPERIENCE

Department of Physics and JILA, University of Colorado, Boulder, USA Department of Physics

Teaching Assistant

09/2009 – 05/2010

Research Assistant

05/2010 – present

RESEARCH EXPERIENCE

Middle East Technical University, Ankara, Turkey *Undergraduate Researcher*

2006

Studied on changing of XPS results of Si under pressure with computational simulation Quantum-Espresso(PWSCF) with Hande Ustunel's group

University of California, Los Angeles, USA

Summer Intern

06–08/2008

Studied on Label-free, Ultra-wide field and Massively Parallel Optical Cell Counting Technologies for HIV and Related Global Health Problems with Aydogan Ozcan's group

- Member of IEEE, IEEE Magnetic Society, APS
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PUBLICATIONS

1. Chan La-O-Vorakiat, **Emrah Turgut**, Carson A Teale, Henry C Kapteyn, Margaret M Murnane, Stefan Mathias, Martin Aeschlimann, Claus M Schneider, Justin M Shaw, Hans T Nembach, Thomas J Silva *Ultrafast Demagnetization Measurements Using Extreme Ultraviolet Light: Comparison of Electronic and Magnetic Contributions*, Physical Review X **2**, 1-7 (2012). Highlight by Jean-Yves Bigot, Spin-Sensitive Optics, Physics **5**, 11 (2012)
 2. Stefan Mathias, Chan La-O-Vorakiat, Patrik Grychtol, Patrick Granitzka, **Emrah Turgut**, Justin M. Shaw, Roman Adam, Hans T. Nembach, Mark E. Siemens, Steffen Eich, Claus M. Schneider, Thomas J. Silva, Martin Aeschlimann, Margaret M. Murnane, and Henry C. Kapteyn, *Probing the timescale of the exchange interaction in a ferromagnetic alloy*, PNAS **109** 4792, (2012). Highlighted by Physics Today **65** (5), 18 (2012)
 3. Denis. Rudolf, Chan La-O-Vorakiata, Marco Battiato, Roman Adam, Justin M. Shaw, **Emrah Turgut**, Pouble Maldonado, Stefan Mathias, Patrik Grychtol, Hans T. Nembach, Tom J. Silva, Martin Aeschlimann, Henry C. Kapteyn, Margaret M. Murnane, Claus M. Schneider, and Peter M. Oppeneer, "Ultrafast magnetization enhancement in metallic multilayers driven by superdiffusive spin current," Nature Communications **3**, 1037 (2012).
 4. Stefan Mathias, Chan La-o-vorakiat, Justin M. Shaw, **Emrah Turgut**, Patrik Grychtol, Roman Adam, Dennis Rudolf, Hans T. Nembach, Thomas J. Silva, Martin Aeschlimann, Claus M. Schneider, Henry C. Kapteyn, Margaret M. Murnane, *Ultrafast element-specific magnetization dynamics of complex magnetic materials on a table-top*, invited review paper, in press, Journal of Electron Spectroscopy and Related Phenomena (2013) <http://dx.doi.org/10.1016/j.elspec.2012.11.013>
 5. **Emrah Turgut**, Chan La-o-vorakiat, Justin Shaw, Hans Nembach, Dennis Rudolf, Roman Adam, Stefan Mathias, Martin Aeschlimann, Claus Schneider, T. J. Silva, Henry Kapteyn and Margaret Murnane, *Controlling the Competition between Spin Transport and Optically Induced Demagnetization in Magnetic Multilayers*, Physical Review Letter **110**, 197201 (2013).
 6. **Emrah Turgut**, Patrik Grychtol, La-O Chan, Daniel E Adams, Henry C Kapteyn, Margaret M Murnane, Stefan Mathias, Martin Aeschlimann, Claus M Schneider, Justin M Shaw, Hans T Nembach, Thomas J Silva, *Reply to Comment on Ultrafast Demagnetization Measurements Using Extreme Ultraviolet Light: Comparison of Electronic and Magnetic Contributions*, Physical Review X, **3**, 3 (2013).
 7. Ofer Kfir, Patrik Grychtol, **Emrah Turgut**, Ronny Knut, Dmitriy Zusin, Dimitar Popmintchev, Tenio Popmintchev, Hans Nembach, Justin M. Shaw, Avner Fleicher, Henry Kapteyn, Margaret Murnane, Oren Cohen *Generation of bright circularly-polarized extreme ultraviolet high harmonics for magnetic circular dichroism spectroscopy*. <http://arxiv.org/abs/1401.4101>
 8. Emrah Turgut et al. *Investigation on modification of electronic configuration during ultrafast demagnetization in Co*, in prep.
 9. K. Hogeboom, Emrah Turgut et al. *A non-destructive approach to the characterization of ultrathin films with extreme-ultraviolet photons*, in prep.
 10. Ronny Knut et. al. *Modification of electronic configuration of Ni-Fe alloys by diluting Cu using XMCD*, in prep.
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CONFERENCES

1. **Poster** Emrah Turgut, C. La-o-vorakiat, S. Mathias, P. Grychtol, P. Granitzka, J. M. Shaw, R. Adam, H. T. Nembach, M. E. Siemens, S. Eich, C. M. Schneider, T. J. Silva, M. Aeschlimann, M. M. Murnane, and H. C. Kapteyn, Probing the Timescale of the Exchange Interaction in a Ferromagnetic Alloy, *Eighth Annual Site Visit, NSF Engineering Research Center for Extreme Ultraviolet Science and Technology, Berkeley, CA May 2011*.
2. **Talk** Emrah Turgut, C. La-o-vorakiat, S. Mathias, P. Grychtol, P. Granitzka, J. M. Shaw, R. Adam, H. T. Nembach, M. E. Siemens, S. Eich, C. M. Schneider, T. J. Silva, M. Aeschlimann, M. M. Murnane, and H. C. Kapteyn "Ultrafast Demagnetization Measurements using Extreme Ultraviolet Light: Comparison of Electronic and Magnetic Contributions." *APS March Meeting 2012. Volume 57. Number 1*

3. **Poster and Talk** C. La-o-vorakiat, E. Turgut, S. Mathias, D. Rudolf J. M. Shaw, C. Teale, P. Grychtol, P. Granitzka, R. Adam, H. T. Nembach, S. Eich, C. M. Schneider, M. Aeschlimann, T. J. Silva, H. C. Kapteyn, and M. M. Murnane "Element-Selective Ultrafast Demagnetization Dynamics with a Tabletop High-harmonic Generation Light Source." *Gordon Research Conference 2012*, Finalist of the best poster award.
4. **Poster** Emrah Turgut, C. La-o-vorakiat, S. Mathias, P. Grychtol, P. Granitzka, J. M. Shaw, R. Adam, H. T. Nembach, M. E. Siemens, S. Eich, C. M. Schneider, T. J. Silva, M. Aeschlimann, M. M. Murnane, and H. C. Kapteyn, Element-Selective Ultrafast Magnetization Dynamics with a Tabletop High-harmonic Generation Light Source, 5th IEEE Magnetics Society Summer School, Chennai, India, July 2012. Presented by Emrah Turgut.
5. **Talk** Emrah Turgut, C. La-o-vorakiat, P. Grychtol, H. C. Kapteyn, M. M. Murnane, J. M. Shaw, H. T. Nembach, T. J. Silva, D. Rudolf, R. Adam, C. M. Schneider, S. Mathias, M. Aeschlimann, M. Battiato, P. M. Oppeneer "Ultrafast Magnetization Enhancement in Metallic Multilayers Driven by Superdiffusive Spin Current" *MMM/Intermag 2013 FC-03, Chicago*
6. **Talk** Emrah Turgut, C. La-o-vorakiat, P. Grychtol, H. C. Kapteyn, M. M. Murnane, J. M. Shaw, H. T. Nembach, T. J. Silva, D. Rudolf, R. Adam, C. M. Schneider, S. Mathias, M. Aeschlimann, M. Battiato, P. M. Oppeneer "Ultrafast Magnetization Enhancement in Metallic Multilayers Driven by Superdiffusive Spin Current" *APS March Meeting, Baltimore 2013*
7. **Poster** Emrah Turgut, C. La-o-vorakiat, P. Grychtol, H. C. Kapteyn, M. M. Murnane, J. M. Shaw, H. T. Nembach, T. J. Silva, D. Rudolf, R. Adam, C. M. Schneider, S. Mathias, M. Aeschlimann, M. Battiato, P. M. Oppeneer "Element-selective ultrafast magnetization dynamics with an extreme ultraviolet tabletop source" *MMM, Denver 2013*
8. **Talk** Emrah Turgut, C. La-o-vorakiat, P. Grychtol, H. C. Kapteyn, and M. M. Murnane, J. M. Shaw, H. T. Nembach, T. J. Silva, D. Rudolf, R. Adam, C. M. Schneider, S. Mathias, M. Aeschlimann, "Controlling Ultrafast Spin Currents in Magnetic Multilayers Driven by Superdiffusive Spin Current" *Gordon Research Seminar, Ultrafast Phenomena in Cooperative Systems, Ventura 2014*
9. **Poster** Emrah Turgut, P. Grychtol, H. C. Kapteyn, C. La-o-vorakiat, M. M. Murnane, J. M. Shaw, H. T. Nembach, T. J. Silva, D. Rudolf, R. Adam, C. M. Schneider, S. Mathias, M. Aeschlimann, "Controlling Ultrafast Spin Currents in Magnetic Multilayers Driven by Superdiffusive Spin Current" *Gordon Research Conference, Ultrafast Phenomena in Cooperative Systems, Ventura 2014*

TALKS

1. "Ultrafast Element-Selective Magnetization Dynamics in Alloys and Multilayers" Emrah Turgut, C. La-o-vorakiat, S. Mathias, D. Rudolf, J.M. Shaw, C. Tale, P. Grychtol, P. Granitzka, R. Adam, H.T. Nembach, Tom Silva, C.M. Schneider, M. Aeschlimann, H.C. Kapteyn, and M.M. Murnane. Department of Physics, Middle East Technical University, Ankara, Turkey.

HONOURS AND AWARDS

Attending IEEE Magnetic Society Summer School 2012 by full support, Chennai, India (2012 July)
 Attending UXSS 2012 Summer School by full support, SLAC Stanford (2012 June)
 Best poster award in UXSS 2010 Summer School, SLAC Stanford (2010 June)
 Attending UXSS 2010 Summer School by full support, SLAC Stanford (2010 June)
 University of Colorado assistantship in Physics Department (August 2009 - present)
 Full scholarship awarded by TUBITAK (The Scientific and Technical Research Council of Turkey) during B.S. education (September 2005-June 2009)
 Graduated with high honor degree, Middle East Technical University (2009)
 Awarded by TUBITAK with \$10000 in high school due to outstanding success in Physics Olympiads (2005)
 Awarded a **Gold Medal** in 36th International Physics Olympiad held in Salamanca, Spain (2005)
 Awarded a **Gold Medal** in National Physics Olympiad organized by TUBITAK (2004)
 Honored by Recep Tayyip Erdogan, Prime Minister of Turkey and by Huseyin Celik, Minister of Education of Turkey (because of outstanding success in different contests in 2004) (2004)
 Ranked 1st in Regional Physics Olympiad among 3000 candidates organized by TUBITAK (2004)

Awarded a **Bronze Medal** in 35th International Physics Olympiad held in Pohang, South Korea (2004)

Awarded a **Bronze Medal** in National Physics Olympiad organized by TUBITAK (2003)

SKILLS

Programming:

Unix, C, MATLAB, Labview

OriginPro, L^AT_EX, Mathematica, Microsoft Office, Autodesk and varied laboratory and data acquisition software

Languages:

Turkish (native), English (advanced),

PERSONAL

DOB: April, 1988

Married and father of a daughter.

EXTRACURRICULAR ACTIVITIES Tutoring high school students for the National and International Physics Olympiads for Private Samanyolu High School (2005-2009)

Participated as an Instructor and Tutor in Physics Olympiad Summer Training Camp organized by TUBITAK September (2006-2008)

Founder and the president of Rumi Club at University of Colorado (2010-2014)

References

Available upon request.