Dr. Michael **Pürrer**

Senior Postdoc · Computational Gravitational-Wave Astronomy

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Education

2003 - 2007	PhD in Theoretical Physics with distinction, University of Vienna, Austria.
1991 - 2003	Diploma in Theoretical Physics with distinction, University of Vienna.
2001 - 2002	Alternative service (“Zivildienst”) at Geriatriezentrum Baumgarten, Vienna.
1993 - 1998	Study of English as a school teacher and Jazz guitar & popular music.
1991	Matura, with distinction, Grammar school Amstetten, Austria.

Research Experience

01/2017 –	Senior Scientist, MPI for Gravitational Physics (AEI), Potsdam, Germany.
09/2015 – 12/2016	Postdoc, MPI for Gravitational Physics (AEI), Potsdam, Germany.
02/2012 – 08/2015	Research Associate, Cardiff University, United Kingdom.
08/2010 – 01/2012	Postdoctoral researcher, University of Vienna, Austria.
2009 - 2010	Technical Consultant for modeling and simulation of fuel injection systems, ECS GmbH & CoKG / MAGNA POWERTRAIN, Vienna, Austria.
2007 - 2008	Postdoctoral researcher, University of Vienna, Austria.

Professional Affiliations and Service

- Member and author of the LIGO Scientific Collaboration (LSC)
- Member of Simulating eXtreme Spacetimes (SXS) collaboration
- Member of the LISA Consortium and the LISA data challenge
- Member of 3G Science Case Team: Lead for waveform and data analysis part of document
- Refereeing: ApJ Letters, ApJ, Physical Review Letters, Physical Review D, WIREs Computational Statistics, Classical and Quantum Gravity

Citation statistics from `ui.adsabs.harvard.edu` for “`Pürrer, Michael`”

- Refereed citations for all 148 refereed papers:
  h-index: 64; average citations: 258.0; total citations: 38187.
- Refereed citations all 35 refereed papers excluding LIGO-Virgo Collaboration papers:
  h-index: 25; average citations: 79; total citations: 2766.

Language Competency

German (native), English (fluent), French (*A2*).

Awards and honors

- Recipient of 2016 Special Breakthrough Prize in Fundamental Physics (as part of the LSC).
- Recipient of 2016 Gruber Cosmology Prize (as part of the LSC).
- Recipient of Premio Princesa de Asturias de Investigación 2017 (as part of the LSC).
- Recipient of 2017 RAS Group Achievement Award 'A' (as part of the LSC).

Work as Organizer

June 18 - 22, 2018 **Workshop on Reduced Order Gravitational-Wave Modeling**, Max Planck Institute for Gravitational Physics, Potsdam, June 18 - 22, 2018. https://workshops.aei.mpg.de/gw-rom-roq/

Invited Conference and Workshop Talks

18 Nov 2020 **ICERM - Statistical Methods for the Detection, Classification, and Inference of Relativistic Objects**, Brown University. "Incorporating waveform uncertainty into modeling and inference of GWs".

24 Aug 2020 **Rethinking the Relativistic Two-Body Problem** , AEI Potsdam-Golm. "Do CBC searches and inference in the next five years need to include more physical effects?"

3 May 2020 **GW-MULL Gravitational waves and machine learning retreat meeting 2020**, Tobermory, Scotland. "Accelerating waveform models with machine learning methods.". Canceled due to COVID.

2 Oct 2019 **COST CA18108 Kickoff Meeting**, Barcelone, Spain. "Data Analysis Techniques for Testing General Relativity with GWs."

28 Aug 2019 **Lost In Gravity 2019**, Saint Flour, France. "Numerical and analytical approaches in modeling binary black hole sources."

1 Dec 2018 **Joint Space-Science Institute - Gravitational Wave Physics and Astronomy Workshop**, Maryland. Plenary talk "Observations of Compact Binary Mergers by Advanced LIGO and Advanced Virgo during the First and Second Observing Runs", on behalf of the LVC.

1 - 2 October 2018 **Third-Generation Science-Case Consortium Meeting**, AEI Potsdam, "Parameter estimation of a GW150914-like numerical relativity signal".

27 - 31 Aug. 2018 **TeV Particle Astrophysics**, Berlin, "Gravitational Wave Observations of Binary Black Hole Coalescences with LIGO/Virgo", on behalf of the LVC.

3 - 9 June 2018 **Numerical Relativity beyond General Relativity**, Benasque, "Understanding systematics in General Relativity".

14-17 Aug. 2017 **Physics and Astrophysics at the eXtreme workshop**, Nikehf, Amsterdam, "Future of Surrogates and Other Acceleration Techniques".

1 - 3 Dec. 2016 **Physics and Astrophysics at the eXtreme workshop**, Penn State, "Computational challenges in gravitational-wave measurement".

28 Aug. - 2 Sept. 2016 **LVC collaboration meeting**, Glasgow, plenary talk "Assessing Accuracy of Waveform Models to Best Interpret GW150914".

11-12 May 2015 **Cwrt Bleddyn Black hole workshop**, Wales, "Can we measure component spins of (spin-aligned) black-hole binaries from gravitational wave signals?"

Colloquia and selected Seminar Talks

Oct 15, 2020	**Universidad Nacional de Córdoba. Argentina**, “Regression methods in waveform modeling: a comparative study”.
Feb 14, 2020	**Montana State University**, “Precision gravitational wave astronomy with next generation waveform models”.
Nov 20, 2019	**University of Glasgow**, “Precision gravitational wave astronomy with next generation waveform models”.
Nov 7, 2019	**MPI for Gravitational Physics, Hannover**, “Advances in Modeling Gravitational Waves from Compact Binary Coalescences”.
May 28, 2019	**Ghent University**, “Precision gravitational wave astronomy with efficient data analysis methods”.
Nov 23, 2017	**CENTRA, Lisbon**, “The interplay between source modeling and parameter estimation for gravitational waves from compact binaries”.
May 12, 2016	**University of Vienna**, “Estimating source parameters of GW150914: The role of waveform models and numerical relativity simulations”.
April 24, 2015	**CITA, Toronto**, “Can we measure component spins of (spin-aligned) black-hole binaries from gravitational wave signals?”
Jan. 16, 2015	**AEI Potsdam**, “Gravitational Waves From Black Hole Binaries: Waveform Models And Applications”.
June 13, 2014	**Queen Mary, London**, “Models for gravitational waves from compact binaries”.
Nov. 19, 2014	**DAMTP Cambridge**, “Frequency domain reduced order models for gravitational waves from aligned-spin black-hole binaries”.
March 12, 2014	**Birmingham University**, “Frequency domain reduced order models for gravitational waves from aligned-spin black-hole binaries”.
Sept. 27, 2012	**UIB, Palma de Mallorca**, “Testing the validity of the single-spin approximation in IMR waveforms”.
Aug. 12, 2012	**Caltech**, “An efficient iterative method to reduce eccentricity in numerical-relativity simulations of compact binary inspiral”.

Conference Talks

6-8 Feb. 2019	**AEI division retreat, Ringberg Castle, Germany**, “How we will see binary black holes and intermediate mass binary black holes with future ground based detectors”.
14-17 Aug. 2017	**LVC Waveform f2f workshop, Berlin**, “Statistical Gravitational Waveform Models: What to Simulate Next?”.
28 Aug. - 1 Sept. 2017	**LVC Collaboration meeting, CERN**, “Reduced Order Quadrature for SEOBNRv4_ROM_NRTidal”, “Surrogate model of BNS waveforms with aligned spin and tides”, “Matches between tidal IMR approximants”, “New NR-surrogate implementations”.
30 May - 2 June 2017	**GWPAW17, Annecy**, “Measuring NS tidal deformability from LIGO observations of disruptive NSBH binaries”.
13 - 16 March 2017	**LVC Collaboration meeting, Pasadena**, “Status of Reduced Order Models and Reduced Order Quadratures”.
15 - 20 April 2016	**APS April meeting, Salt Lake City**, on behalf of the LVC, “Assessing Accuracy of Waveform Models to Best Interpret GW150914”.

12-18 July 2015	**Marcel Grossman MG14 meeting, Rome**, “Accelerating Parameter Estimation of Gravitational Waves from Black Hole Binaries with Reduced Order Quadratures”.
Dec. 1-5, 2014	**Conclusion Workshop of SFB/TR7, “Gravitational Wave Astronomy”, Jena**, “Frequency domain reduced order models for gravitational waves from aligned-spin black-hole binaries”.
Aug. 24-28, 2014	**LVC Collaboration meeting, Stanford**, “Reduced order modeling”.
Aug. 21-22, 2014	**Numerical and Analytical Relativity and Data Analysis, U Fullerton, LA**, “Frequency domain reduced order models for gravitational waves from aligned-spin black-hole binaries”.
March 31 - April 1, 2014	**Britgrav, Cambridge**, “Frequency domain reduced order models for gravitational waves from aligned-spin black-hole binaries”.
Sept. 18-21, 2013	**Numerical Relativity - Data Analysis, Mallorca**, “Testing the validity of the single- spin approximation in inspiral-merger-ringdown waveforms”.
Dec 10 – 21, 2012	Invited to **“Dynamics of General Relativity: Black Holes and Asymptotics”**, ESI, Vienna, Austria.
April 3-4, 2012	**Britgrav, Southampton**, “An efficient iterative method to reduce eccentricity in numerical-relativity simulations of compact binary inspiral”.
July 10-15, 2011	**NRDA / Amaldi9, Cardiff**, “A New Method for Reducing Orbital Eccentricity of Binary Black-hole Initial Data”.

Conference Posters

13 - 19 March 2016	**LVC Collaboration meeting, Pasadena**, won poster prize: R. Smith et al., “Fast and Accurate Inference on Gravitational Waves from Precessing Compact Binaries”.
17-20 June 2015	**GWPAW2015 meeting**, Osaka, Japan. “Can we measure component spins of (spin-aligned) black-hole binaries from gravitational wave signals?”
July 30 – Aug. 03, 2012	**Rattle and Shine: Gravitational Wave and Electromagnetic Studies of Compact Binary Mergers, KITP, Santa Barbara**, “OBJTesting the validity of the single-spin approximation in IMR waveforms”.
March 27-30, 2012	**RAS-NAM, Manchester**, “An efficient iterative method to reduce eccentricity in numerical-relativity simulations of compact binary inspiral”.
May 20-22, 2011	**ACCGR, Brown University, Providence**, “A New Method for Reducing Orbital Eccentricity of Binary Black-hole Initial Data”
March 2004	**WE-Heraeus-Seminar mathematical relativity, Bad Honnef, Germany**, “News from Critical Collapse”.

Teaching Experience

2012	Exercise course on *Introduction to General Relativity*, Cardiff University, UK.
2011-2012	Lecture and exercise course on *Numerical Relativity*, University of Vienna.
2009	Lecture and exercise course on *Scientific Computing*, University of Vienna.
2004 - 2008	A practical two-part course on Scientific Computing and Numerics, University of Vienna.

Outreach

May 5, 2018	Participated in the **Potsdam Science Day** at the University of Potsdam at the **AEI booth**. I talked about about gravitational waves and the detections. About 15.000 people visited this event.
Oct. 16, 2017	Talk **New developments in gravitational wave astronomy** on the first gravitational wave detection from binary neutron stars by the LVC, AEI Potsdam, Germany.
Dec. 2016	**Austrian newspaper interview**, first gravitational wave detection by the LVC.
Dec. 2012	**IOP newsletter**, article on eccentricity reduction for BBHs.
April 2012	**Brochure for Vienna Scientific Cluster**, contribute project summary for BBH collisions.
Nov. 2011	**Austrian newspaper coverage**, PRACE-project.