

Gravitational Waves from the Early Universe

Report of Contributions

Contribution ID: 250

Type: **not specified**

Gravitational wave energy budget in strongly supercooled phase transitions

Monday, August 26, 2019 10:15 AM (50 minutes)

We derive efficiency factors for the production of gravitational waves through bubble collisions and plasma-related sources in strong phase transitions, and find the conditions under which the bubble collisions can contribute significantly to the signal. We illustrate our findings in two examples, the Standard Model with an extra $|H|^6$ interaction and a classically scale-invariant $U(1)_{B-L}$ extension of the Standard Model. The contribution to the GW spectrum from bubble collisions is found to be negligible in the $|H|^6$ model, whereas it can play an important role in parts of the parameter space in the scale-invariant $U(1)_{B-L}$ model. In both cases the sound-wave period is much shorter than a Hubble time, suggesting a significant amplification of the turbulence-sourced signal. We find, however, that the peak of the plasma-sourced spectrum is still produced by sound waves with the slower-falling turbulence contribution becoming important off-peak.

Primary author: Dr LEWICKI, Marek

Presenter: Dr LEWICKI, Marek

Contribution ID: 251

Type: **not specified**

A Real-Time Picture of False Vacuum Decay

Tuesday, August 27, 2019 10:00 AM (50 minutes)

Primary author: Dr BRADEN, Jonathan (CITA)

Contribution ID: 252

Type: **not specified**

Gravitational wave spectra from primordial magnetohydrodynamic turbulence

Monday, August 26, 2019 2:00 PM (50 minutes)

Primary author: ROPER POL, Alberto (University of Colorado. LASP)

Presenter: ROPER POL, Alberto (University of Colorado. LASP)

Contribution ID: 253

Type: **not specified**

Registration

Monday, August 26, 2019 1:00 PM (50 minutes)

Primary author: LEKKA, Olga (Nordita)

Contribution ID: 254

Type: **not specified**

Welcome and introductory remarks

Monday, August 26, 2019 10:00 AM (15 minutes)

Primary authors: Prof. BRANDENBURG, Axel (Nordita); Dr HINDMARSH, Mark (University of Sussex); KAHNIASHVILI, Tina (Carnegie Mellon University (USA) & Ilia State University (Georgia))

Contribution ID: 255

Type: **not specified**

TBC

Tuesday, August 27, 2019 2:00 PM (50 minutes)

Contribution ID: 256

Type: **not specified**

Wine & cheese, BBQ, Welcome from Nordita director Niels Obers

Tuesday, August 27, 2019 4:30 PM (2h 30m)

Contribution ID: 257

Type: **not specified**

Latest observational signatures of cosmic strings: Gravitational waves and particle emission

Wednesday, August 28, 2019 10:00 AM (50 minutes)

Primary author: AUCLAIR, Pierre (APC)

Presenter: AUCLAIR, Pierre (APC)

Contribution ID: 258

Type: **not specified**

Gravitational wave generation in a viable scenario of inflationary magnetogenesis

Wednesday, August 28, 2019 3:30 PM (50 minutes)

Primary author: SHARMA, Ramkishor (University of Delhi)

Presenter: SHARMA, Ramkishor (University of Delhi)

Contribution ID: 259

Type: **not specified**

Formation and evolution of primordial black hole binaries

Thursday, August 29, 2019 10:00 AM (50 minutes)

Primary author: Dr VASKONEN, Ville (Kings College, London)

Presenter: Dr VASKONEN, Ville (Kings College, London)

Contribution ID: **260**

Type: **not specified**

No talk

Thursday, August 29, 2019 2:00 PM (50 minutes)

Contribution ID: 261

Type: **not specified**

Gravitational Waves: The stochastic background and its anisotropies.

Friday, August 30, 2019 10:00 AM (50 minutes)

Primary author: Prof. SAKELLARIADOU, Mairi (King's College London)

Presenter: Prof. SAKELLARIADOU, Mairi (King's College London)

Contribution ID: 262

Type: **not specified**

Stochastic gravitational waves from preheating

Friday, August 30, 2019 2:00 PM (50 minutes)

Primary author: LIU, Jing (Institute of Theoretical Physics, Chinese Academy of Sciences)

Presenter: LIU, Jing (Institute of Theoretical Physics, Chinese Academy of Sciences)

Contribution ID: 263

Type: **not specified**

Nordita Astrophysics Seminar

Wednesday, August 28, 2019 1:30 PM (50 minutes)

<https://agenda.albanova.se/conferenceDisplay.py?confId=6809>

Contribution ID: 264

Type: **not specified**

Nonperturbative analysis of the electroweak phase transition and its gravitational wave signal

Monday, September 2, 2019 10:00 AM (50 minutes)

Primary author: Dr GOULD, Oliver (Helsinki University)

Presenter: Dr GOULD, Oliver (Helsinki University)

Contribution ID: **265**

Type: **not specified**

BBQ

Monday, September 2, 2019 4:30 PM (2h 30m)

Contribution ID: 266

Type: **not specified**

Phase transitions in BSM models and numerical simulations

Thursday, September 5, 2019 10:00 AM (50 minutes)

Primary author: Dr RUMMUKAINEN, Kari (University of Oulu)

Presenter: Dr RUMMUKAINEN, Kari (University of Oulu)

Contribution ID: 267

Type: **not specified**

Bubble wall velocities in first-order phase transitions

Tuesday, September 3, 2019 2:00 PM (50 minutes)

Primary author: Dr HUBER, Stephan (University of Sussex)

Presenter: Dr HUBER, Stephan (University of Sussex)

Contribution ID: **268**

Type: **not specified**

Nordita talk and social event

Wednesday, September 4, 2019 4:30 PM (2 hours)

Contribution ID: 269

Type: **not specified**

Gravitational waves from first-order phase transitions: ultra-supercooled transitions and the fate of relativistic shocks

Tuesday, September 3, 2019 10:00 AM (50 minutes)

Primary author: Dr JINNO, Ryusuke (DESY)

Presenter: Dr JINNO, Ryusuke (DESY)

Contribution ID: 270

Type: **not specified**

Contributions of MHD turbulence to primordial gravitational wave production

Friday, September 6, 2019 10:00 AM (50 minutes)

Primary author: Prof. SIGL, Guenter (University of Hamburg)

Presenter: Prof. SIGL, Guenter (University of Hamburg)

Contribution ID: 271

Type: **not specified**

Sound shell model of acoustic gravitational wave production

Wednesday, September 4, 2019 10:00 AM (50 minutes)

Primary author: Dr HINDMARSH, Mark (University of Sussex)

Presenter: Dr HINDMARSH, Mark (University of Sussex)

Contribution ID: 272

Type: **not specified**

Gravitational wave detection with atomic clocks

Friday, September 6, 2019 3:30 PM (50 minutes)

Primary author: Dr PIKOVSKI, Igor (University of Stockholm)

Presenter: Dr PIKOVSKI, Igor (University of Stockholm)

Contribution ID: 273

Type: **not specified**

Chiral effects as the source of MHD turbulence and large-scale magnetic field

Monday, September 9, 2019 10:00 AM (50 minutes)

Primary author: Prof. ROGACHEVSKII, Igor (Ben-Gurion University of the Negev)

Presenter: Prof. ROGACHEVSKII, Igor (Ben-Gurion University of the Negev)

Contribution ID: 274

Type: **not specified**

Strong first-order phase transitions: Vorticity, droplets and gravitational waves

Tuesday, September 10, 2019 10:00 AM (50 minutes)

Primary author: CUTTING, Daniel (University of Sussex)

Presenter: CUTTING, Daniel (University of Sussex)

Contribution ID: 275

Type: **not specified**

Observing the Gravitational Universe with the LISA

Wednesday, September 11, 2019 10:00 AM (50 minutes)

Primary author: Dr PETITEAU, Antoine (Laboratoire APC)

Presenter: Dr PETITEAU, Antoine (Laboratoire APC)

Contribution ID: 276

Type: **not specified**

Inflationary magnetogenesis and the gravitational wave signal

Friday, September 13, 2019 10:00 AM (50 minutes)

Primary author: MANDAL, Sayan (Carnegie Mellon University)

Presenter: MANDAL, Sayan (Carnegie Mellon University)

Contribution ID: 277

Type: **not specified**

TBC

Contribution ID: 278

Type: **not specified**

Gravitational Waves: The stochastic background and its anisotropies

Monday, September 16, 2019 1:00 PM (45 minutes)

Presenter: Prof. SAKELLARIADOU, Mairi (King's College London)

Contribution ID: 279

Type: **not specified**

Coherent Gravitational waves from cosmic strings

Tuesday, September 17, 2019 3:00 PM (45 minutes)

Presenter: Dr LIM, Eugene (Kings College, London)

Contribution ID: 280

Type: **not specified**

Gravitational wave production from Inflaton Collapse/A stringent limit on primordial magnetic fields from the CMB

Monday, September 16, 2019 3:45 PM (45 minutes)

Presenter: Prof. JEDAMZIK, Karsten

Contribution ID: **281**

Type: **not specified**

Gravitational waves as a probe of the history of the universe

Monday, September 16, 2019 1:45 PM (45 minutes)

Presenter: Prof. YOKOYAMA, Jun'ichi (RESCEU, University of Tokyo)

Contribution ID: **282**

Type: **not specified**

TBC

Contribution ID: 283

Type: **not specified**

Probing the Inflationary Field Content with Primordial Gravitational Waves

Tuesday, September 17, 2019 10:45 AM (45 minutes)

Presenter: FASIELLO, Matteo (ICG Portsmouth)

Contribution ID: **284**

Type: **not specified**

TBC

Contribution ID: **285**

Type: **not specified**

TBC

Contribution ID: 286

Type: **not specified**

Constraining gravitational waves from inflation

Monday, September 16, 2019 3:00 PM (45 minutes)

Presenter: DIMASTROGIOVANNI, Emanuela (University of Sydney)

Contribution ID: **287**

Type: **not specified**

Discussion session

Tuesday, September 17, 2019 3:45 PM (45 minutes)

Contribution ID: **288**

Type: **not specified**

Gravitational waves from the sound of a phase transition

Wednesday, September 18, 2019 10:00 AM (45 minutes)

Presenter: Dr HINDMARSH, Mark (University of Sussex)

Contribution ID: 289

Type: **not specified**

Simulating a strongly first-order thermal phase transition

Wednesday, September 18, 2019 10:45 AM (45 minutes)

Presenter: Prof. WEIR, David (University of Helsinki)

Contribution ID: 290

Type: **not specified**

Primordial turbulent sources for gravitational waves

Wednesday, September 18, 2019 1:00 PM (45 minutes)

Presenter: KAHNIASHVILI, Tina (Carnegie Mellon University (USA) & Ilia State University (Georgia))

Contribution ID: 291

Type: **not specified**

Numerical simulations of gravitational waves from early universe turbulence

Wednesday, September 18, 2019 1:45 PM (45 minutes)

Presenter: ROPER POL, Alberto (University of Colorado. LASP)

Contribution ID: 292

Type: **not specified**

Gravitational wave evolution from acoustic and vortical sources

Wednesday, September 18, 2019 3:00 PM (45 minutes)

Presenter: BRANDENBURG, Axel (Nordita)

Contribution ID: 293

Type: **not specified**

Discussion session

Wednesday, September 18, 2019 3:45 PM (45 minutes)

Contribution ID: 294

Type: **not specified**

Probing the Physics of the Early Universe with Gravitational Wave Interferometers

Thursday, September 19, 2019 1:45 PM (45 minutes)

Presenter: Dr TASINATO, Gianmassimo (University of Swansea)

Contribution ID: 295

Type: **not specified**

Early confinement and gravitational waves

Thursday, September 19, 2019 10:00 AM (45 minutes)

Presenter: Dr CROON, Djuna (TRIUMF)

Contribution ID: 296

Type: **not specified**

Thermal resummation and the electroweak phase transition

Thursday, September 19, 2019 10:45 AM (45 minutes)

Presenter: Dr JIANG, Yun (MPIK Heidelberg)

Contribution ID: 297

Type: **not specified**

Low-frequency gravitational wave detection with astrometric data

Thursday, September 19, 2019 1:00 PM (45 minutes)

Presenter: MIHAYLOV, Deyan (Albert Einstein Institute, Potsdam)

Contribution ID: 298

Type: **not specified**

Colloquium: Baryons, dark matter and black holes: a common origin

Thursday, September 19, 2019 3:00 PM (1 hour)

Twenty-three years ago, we predicted that massive primordial black holes (PBH) would form via the gravitational collapse of radiation and matter associated with high peaks in the spectrum of curvature fluctuations, and that they could constitute all of the dark matter (DM) today. In 2015, we predicted the clustering and broad mass distribution of PBH, which peaks at several M_{sun} , and whose high-mass tails could be responsible for the seeds of all galaxies. Since then, AdvLIGO-Virgo interferometers have detected gravitational waves from at least thirty merger events of very massive and spinless black hole binaries, and we propose that they are PBH. We have recently understood that a universal mechanism associated with rapid changes in the number of relativistic species in the early universe could have been responsible for the formation of PBH at specific scales and thus have a very concrete prediction for the mass spectrum of DM-PBH, with broad peaks at 10^{-5} , 1, 100, and $10^6 M_{\text{sun}}$. In particular, the QCD quark-hadron transition could be responsible for the efficient production of baryons over antibaryons at PBH collapse, thus explaining the presence of baryons today and the relative abundance of DM. We predict that within a few months a less than one solar mass PBH will be detected by AdvLIGO-Virgo, and that in a few years an array of GW detectors could be used to determine the mass and spin distribution of PBH dark matter with 10% accuracy. Thus, gravitational wave astronomy could be responsible for a new paradigm shift in the understanding of the nature of dark matter and galaxy formation.

Presenter: Prof. GARCIA-BELLIDO, Juan (IFT, Autonoma de Madrid)

Contribution ID: 299

Type: **not specified**

GW and LSS signatures of PBH as Dark Matter

Tuesday, September 17, 2019 10:00 AM (45 minutes)

Presenter: Prof. GARCIA-BELLIDO, Juan

Contribution ID: **300**

Type: **not specified**

Discussion session

Friday, September 20, 2019 10:00 AM (1h 30m)

Contribution ID: **301**

Type: **not specified**

Welcome, registration and introduction

Monday, September 16, 2019 11:00 AM (30 minutes)

Contribution ID: 302

Type: **not specified**

Parameter estimation with LISA for gravitational waves from a first order phase transition

Tuesday, September 10, 2019 2:00 PM (15 minutes)

Presenter: GOWLING, Chloe (University of Sussex)

Session Classification: Short talks - research in progress

Contribution ID: 303

Type: **not specified**

Cosmological Phase Transition Parameters via Holography

Tuesday, September 10, 2019 2:15 PM (15 minutes)

Presenter: ARES, Reuben (University of Sussex)

Session Classification: Short talks - research in progress

Contribution ID: 304

Type: **not specified**

The Lighthill Equation, and the SVT Decomposition of the Stress Tensor

Tuesday, September 10, 2019 2:30 PM (15 minutes)

Presenter: MANDAL, Sayan (Carnegie Mellon University)

Session Classification: Short talks - research in progress

Contribution ID: 305

Type: **not specified**

Subinertial range of gravitational wave spectra sourced by hydromagnetic turbulence

Tuesday, September 10, 2019 2:45 PM (15 minutes)

Presenter: ROPER POL, Alberto (University of Colorado. LASP)

Session Classification: Short talks - research in progress

Contribution ID: **306**

Type: **not specified**

Wine & cheese

Monday, September 16, 2019 4:30 PM (20 minutes)

Contribution ID: **307**

Type: **not specified**

Pizza!

Wednesday, September 18, 2019 5:00 PM (2 hours)