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国台学术报告 NAOC COLLOQUIUM

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Time: Wednesday 2:30 PM, June 29 **Location: A601 NAOC**

Applying Machine Learning for Gravitational-wave Burst Data Analysis

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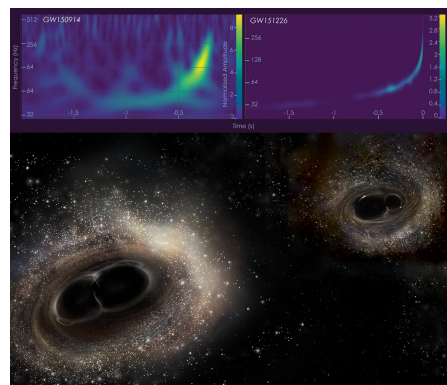
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Junwei Cao is currently Professor and Vice Dean of Research Institute of Information Technology, Tsinghua University, China. He is also Director of Open Platform & Technology Division, Tsinghua National Laboratory for Information Science and Technology, Beijing, China. Before joining Tsinghua in 2006, Junwei Cao was Research Scientist of LIGO Laboratory, Massachusetts Institute of Technology, USA. Before that he worked as Research Scientist of NEC Europe Ltd., Germany. Junwei Cao got his PhD in computer science from University of Warwick, UK, in 2001. He got his master and bachelor degrees from Tsinghua University in 1998 and 1996, respectively. Junwei Cao has published over 200 academic papers and books. He is a council member of LIGO Scientific Collaboration.

Abstract

The direct detection of gravitational waves is enabled by both instrumental technology and massive data analysis. Data glitches can easily be mistaken for gravitational-wave signals, and their robust identification and removal will help any search for gravitational waves. We apply machine-learning algorithms (MLAs) to the problem, using data from auxiliary channels within the LIGO detectors that monitor degrees of freedom unaffected by astrophysical signals. Noise sources may produce artifacts in these auxiliary channels as well as the gravitational-wave channel. The number of auxiliary channel parameters describing these disturbances may also be extremely large; high dimensionality is an area where MLAs are particularly well suited. We demonstrate the feasibility and applicability of three different MLAs: artificial neural networks, support vector machines, and random forests, for veto analysis of gravitational wave bursts.



All are welcome! Tea, coffee, biscuits will be served at 2:15 PM.