

Interaction with KG Arun on gravitational waves

by Nikhil Dixit - Monday, July 25, 2016

<http://gonitsora.com/interaction-kg-arun-gravitational-waves/>

Team Gonitsora interacted with Associate Prof. **KG Arun** from the **Chennai Mathematical Institute** to give its readers some insight into the work done by him and his team on **gravitational waves** which created quite a flutter in the scientific world.

He is a physicist working on various aspects related to compact objects (such as neutron stars and black holes).

He was a VESF fellow at LAL Orsay, and IAP Paris and a postdoctoral research associate at the Washington University in St Louis. He is also an associate of the International Centre for Theoretical Sciences, Bangalore India.

Most importantly, he is a member of the LIGO (**Laser Interferometer Gravitational-Wave Observatory**) Scientific Collaboration and IndIGO consortium. Let's read what he had to say.

Q1) Firstly, we would like to congratulate you on the success of the team. We surely would like to know how you came to be a part of this team.

Gravitational Waves (GWs) has been my topic of research for the past 15 years. I have worked on theoretical and data analysis aspects of the field. I was involved in the LIGO scientific collaboration (which was the team involved with the detection) since 2012 as a member of the IndIGOLSC a subset of IndIGO consortium (Indian Initiative in Gravitational Wave Observations) which is a consortium of scientists who work on various aspects (theory, experiment, data analysis, astrophysics) of GWs.

Q2) The experience that you had must have been pretty amazing. According to you, what is the best thing about being part of such a team?

It indeed has been a wonderful experience to be part of the team. The best part of being in the team, to me, has been the extreme care with which the analysis and interpretation of the data was carried out paying attention to every detail. The collaboration has people with expertise in various aspects of the problem. Each of the subgroups has to coordinate their activities with other sub-groups and function in an efficient manner. Witnessing how the analysis, which lead to the discovery, unfolded and that I could contribute to one of the subgroups was a great experience.

Q3) Our readers would surely relish an opportunity to have a better understanding of the work that your team did and the discovery made.

The subgroup which I was part of was involved in understanding whether the observed signal is consistent with the predictions of Einstein's theory of gravity (General theory of relativity) which has passed all tests thrown at it, with flying colors till date. This observation gave us a unique opportunity to

test the theory in “stronggravity” regime which was not possible earlier.

We looked at this question from various perspectives and found that the observed signal is fully consistent with the predictions of Einstein’s theory, within the statistical uncertainties due to noise.

Q4) Could you tell us in brief about the implications of your discovery? What new opportunities does this discovery open up in the field of Science?

GWs provide a new way of looking at the universe. Many astrophysical phenomena (such as mergers of binary black holes) may not be accompanied by the emission of electromagnetic (EM) radiation. GWs are unique probes of such phenomena. There may be phenomena (such as mergers of double neutron stars) which may emit both GWs and electromagnetic waves. Joint GW+EM observations (often referred to as Multimessenger astronomy) can enrich our understanding of such phenomena. In addition, from a fundamental physics point of view, GWs also provide us opportunity to test Einstein’s theory in the very strong gravitational field limit.

In the Indian context, LIGOIndia project (to build and operate a LIGO detector in India) gives unique opportunity to the young students and Engineers to take part and contribute to the field of GW astronomy.

Q5) Would you be involved in research in this field in the future? How best would you like to carry forward your research?

Yes, I do plan to carry on with my research in this field. In addition to the new insights the first discovery has led us to, there are many open problems and questions that it poses, addressing some of them would be my future direction of research.

Q6) Many times the opinion is raised that research facilities in India are not at par with the facilities that are available in developed countries. What would you like to say on this matter?

India may not have research facilities like some of the developed countries, though we have been consciously addressing this issue in the recent past. As a result of India has invested in many big scientific projects, some in India and some which are international projects which we are part of.

Astrosat (a multiwavelength spacelaboratory), Indian Neutrino Observatory (a planned neutrino experiment in India) and LIGOIndia (a collaborative project with US to have a LIGOlike observatory in India) are some steps in this direction. India is also part of some of the large scale astrophysics project such as Thirty meter telescope (TMT) and Square Kilometer Array (SKA).

Indian scientists have been part of many of the big discoveries, be it the Higgs Boson discovery from Large Hadron Collider experiment or the detection of GWs by the LIGO experiment itself.

Q7) According to you, what is the best way to arouse interest among the students to pursue a career in research and technology?

The best way to arouse interest in science is simply encourage young students to ask questions which they have. Somehow, our teaching system at the school level ends up destroying this very important aspect

which is central to cultivating “scientific temper” among students.

Q8) What motivated you to dedicate your life to research?

What motivates me as a researcher is the sheer pleasure and thrill it gives me. It is not about the end result, but about the route towards it which is exciting.

Q9) Finally, we would request you to leave a message for our readers.

In these modern times, science is not just a discipline but a career option too. Those who are amused by Nature, and have an urge understand how it works, science could easily be both.

PDF generated from <http://gonitsora.com/interaction-kg-arun-gravitational-waves/>.

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.