

September 2023

Dear Colleague

Welcome to the British Physics Olympiad (BPhO) 2023/24. The BPhO provides a series of competition papers for Years 7 - 13 to stretch and challenge talented young physicists. In recent years the competitions have attracted entries from 30-40,000 students. We are sponsored by **G-Research** a number of supporters, including the Universities of Oxford and Cambridge (for Training Camps), National Physical Laboratory, The Royal Astronomical Society and several academic book publishers.

This letter is unfortunately rather long, but it is useful to have this information in one place, and to be able to point out developments in the BPhO. One item that has remained unchanged is the need for support from teachers. Help with writing papers is always needed as they take time and they need checking thoroughly. Thank you to those of you who have offered. I am sure that you will receive an email soon asking for help. We are also running events for students and teachers and we are looking for help to support those. We have a small team and that does limit what we can offer. This help does not require some university level of expertise, but supporting an event with materials provided by the BPhO, and being willing to talk to groups of students or teachers working on questions, etc.

### **Background**

We want to provide opportunities for students to develop their physics and gain confidence in their subject. Finding a paper particularly challenging is not going to demoralise a student who expects to find it particularly challenging. The papers should contain some approachable questions, but also some designed to stretch the students until the elastic snaps. They are expected to be left to think and discuss one or two of the questions after the competition, or else it is merely more of the usual exam experience. They do not need to achieve 90-100% to be satisfied. The intellectual satisfaction of solving a problem that is worth solving, when the results do not affect the student's career, should be developed. In order to gain insight into the physics when it becomes difficult requires resilience, or the student will never be able to stand the heat.

The way to understand a topic more deeply is to try problems which are demanding in gathering the ideas together, which develop determination and perseverance particularly, having an approach (drawing diagrams, etc.), doing problems that are worded in a clear and unambiguous way but do not lead the student to the answer.

### **2023 International Competition Results**

In July, a team of five BPhO finalists represented the UK in the International Physics Olympiad (IPhO) which was held in Tokyo. This was the first IPhO in person for four years. It was a wonderful event, with very interesting physics, both theoretical and practical. Around 400 students from 80 countries participated, and the UK team ended up with three Silver and two Bronze medals – this put the UK 18<sup>th</sup> in the medal table, equal with France as the top Western European countries.

The Astro team who entered the IOAA in Poland produced an astounding performance as the top team out of the 50 countries who entered the IOAA this August. They beat the regular strong teams from Iran and India with a clean sweep of five Gold medals, and with our top student coming 5th globally; they have undoubtedly made their mark on this competition. This team of students were successful in Round 1 of the Physics, and then tried the BAAO Paper in January. One can safely say that they knew next to nothing about Astronomy or Astrophysics at the start and the training brought them up to this level. Teachers should encourage their students to enter the BAAO, as they are not expected to have a background in the subject (more's the pity of course).

In our two teams, often the majority of students come from state schools. These competitions offer opportunities to all students and we would encourage your students to make the most of these.

## Developments

There is a **new website**. The previous one was many years old and unable to cope with updates. The new one is a simple look, but we hope that you can find things easily and that we are more able to keep it up to date.

There is a **new Database** of (so far) ten years of Round 1 papers. Four experts have worked over the summer on this, producing a breakdown by Topic, Year, type of question so that you can make up your own bank of questions to use. It will produce an output that you can print directly, with or without solutions, or you can edit them in Latex. We would not expect you to do that, but you might want to change the title, which could be done very easily in an online Latex platform called Overleaf. There will be some instructions to follow. This is a beta version, and we do need some more proofreading. If you spot anything that needs correcting please send us a comment. The database will be linked to the website, but at present it can be found at

<https://Papers.BPhO.org.uk>

- We are aiming at a new online **Year7/8 paper in April/May**. It is to encourage students, helping them to enjoy physics and will be more of a game and definitely not a challenge paper.
- There is a **change to the Y13 BAAO competitions**. Please see the details in the BAAO letter **attached** to this email.

## The BPhO competitions

The BPhO now runs fifteen competitions for students in Key Stages 3, 4 and 5. All the individual papers are free except BPhO Round 1, and the four online Challenges which require a £20 school registration fee. A summary of the competitions is provided on a downloadable A2 sheet from our website. Further details, past papers and extension work can also be found there: <https://BPhO.org.uk>.

Students may not order papers. You must keep papers secure.

For **International Schools**, the dates may be two or three days later for the Paper Challenge Competitions.

The September **BPhO Physics Challenge** is used by some schools as a resource and by others as a selection process for BPhO Round 1 in November. **BPhO Round 1** was taken by 2830 students last year and is the initial competition paper for selecting a team for the IPhO (July) and EuPhO (July). The top 120+ Round 1 students are invited to take **BPhO Round 2** in February 2024, and the **BAAO Astrophysics Olympiad**, followed by invites to 28 students to attend the Oxford Training Camp over Easter. All competitions can be taken by younger age groups but not by older ones. The **Intermediate Physics Challenge** (GCSE) is taken in March 2024. This paper provides thought provoking questions for strong students with an interest in physics and problems, to develop their skills. Similarly, the **Senior Physics Challenge** (Year 12), taken the week after, provides a competition environment for those students who want to raise their game and see where they stand amongst the top end of their age group. There are also **IPC** and **SPC Online Challenges** that are more about participation and fun in the subject, and are there to build confidence; students can achieve success in a national physics competition.

The **Junior Physics Challenge** and a new **Y7/8 Challenge** are online competitions for students to enjoy interesting and fun activities, but are not exams or challenge competitions.

The **Junior Astro Challenge** is an online competition in November for Y9/10/11 and is for students to show their interest and general knowledge in the subject rather than display technical expertise.

## How to enter

We have an online entry system **for teachers**. This is a new platform and teachers need to register on this by filling in the form [Registration form for Teachers](#): Generally one teacher per school, to avoid confusion. But a second teacher can register. This system is used to enter, download papers, mark schemes and certificates for the competitions, whilst also being the online competition platform. Further details can be found at [www.bpho.org.uk](http://www.bpho.org.uk).

The process of checking teachers wanting to register is a manual one and it does take time. We have students and others trying to register and hence gain access to the papers. So, we do have to check each person. You do not need to reregister each year. If you move on from your school, you will need to register again at your new school. If you have a replacement teacher, they can ask for their name and email address to replace yours on the platform.

The Competition platform <https://exams.bpho.org.uk> is the same one for all competitions, used for downloading papers and also running the online competitions. Students login there as well as teachers, using their username and password. So, you must keep your Teacher login details secure.

Please do not use Gmail, Hotmail, etc. for this. We will not allow them to be used on the Competition Platform

## How to prepare

Past papers are available online, together with the solutions. Students should attempt **at least two or three past papers (minimum)**, and be given the solutions after each one after they have tried the questions, in order to ensure that they know what to expect. Get a small group of your students to work together on a few problems themselves, to develop their skills and interest in a competitive but friendly atmosphere.

It is important that students realise that these written competition papers are taken by the top physics student problem solvers of their age in the country, and that gaining a modest mark still includes them in the very top rank of participants. They should not expect to think that because they are an A/A\* candidate in their usual exams that they will gain a high mark in these challenging papers. Nor does it work the other way. Modern A level papers are not about problem solving. Different skills are required but the physicist needs many skills to succeed. Should they think that because they have scored a low mark on a particularly challenging problem specific paper, that they are a weak physicist or that they will do poorly in the national exam system? These papers and questions are quite different. They require practice and determination. They should be told initially that one of the challenges is simply being willing to take the risk and have a go. Please encourage your students to do so.

## Contacting Us

The BPhO is run by volunteers, all teachers, and we may struggle at times to provide a fully responsive service to every request. But we hope that we get the key things right. It is a struggle at busy times and emails get missed. Do not hesitate to email again. You can also email in to discuss the physics in a question. This is the part that we enjoy.

If you have any questions about the administration competitions or want any information, please contact the BPhO office at [Contact@BPhO.org.uk](mailto:Contact@BPhO.org.uk)

If you would like to be involved in any small way, or have a physics question, then send an email to Robin Hughes at [Contact@BPhO.org.uk](mailto:Contact@BPhO.org.uk). If you think that you have a good question idea for a paper, we would be delighted to hear from you. We do not expect polished questions.

Kind regards,

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