



**United Kingdom Young Physicists' Tournament**  
[www.iypt.org.uk](http://www.iypt.org.uk)

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Dear Colleagues,

It is once again time to find a UK team to compete in the International Young Physicists' Tournament, this coming year in **Bad Saulgau, Germany** from the 20<sup>th</sup> to the 29<sup>th</sup> July 2012.

As previously, I have selected five of the problems from the latest international competition for the UK competition (UKYPT), in line with IYPT regulations.

Schools wishing to participate in UKYPT must find teams of five sixth form students who are prepared to work on solutions to the five problems I have chosen. The best students will then be considered for places in the UK team for IYPT 2012. The team of five students may all come from one school or a maximum of two schools. The international competition requires that each team is accompanied by two team leaders (i.e. teachers), hence the limit of two schools only. One team leader will be asked to act as a jury member during the competition.

Schools must appreciate from the outset that teams must finance themselves in terms of getting to Germany (as far the nearest airport). The host country, Germany, will settle all expenses, food, accommodation, excursions etc. once the competition is underway.

A 'solution' for the UK competition consists of a Powerpoint® (or equivalent) presentation for each problem consisting of between twelve and twenty slides describing the work they have done on that problem. The presentation must be deliverable in ten to twelve minutes. The work will involve a combination of original research work in the laboratory, ICT, theoretical work, mathematical analysis, photos, videos etc. Each presentation must also acknowledge all references used and additional sources of information and help.

The level expected is high, and will typically involve an understanding of physics at the very top end of A level work, and maths to a similar level. Experimental work should show all the skills you would expect of your best students. Graphs, diagrams etc. should be of a similarly high standard. The students must ultimately be prepared to present their solutions to a panel of jurors, and defend their solutions against student opposition.

In the first instance, students will only need to prepare Powerpoint® presentations.

## Dates:

Monday 31<sup>st</sup> October 2011 – Closing date for indicating interest in being included in the UK competition.

Friday 9<sup>th</sup> December 2011 – Closing date for postal and electronic submission of solutions/presentations

January 2012 – The best teams will meet for a head-to-head at a date and venue to be determined. (Entry fee may apply to cover costs.) Ideally this will be three teams of five students along the lines of the international competition. The exact procedures will depend on the number of students involved.

## The Five Problems:

### **1. Gaussian cannon**

A sequence of identical steel balls includes a strong magnet and lies in a nonmagnetic channel. Another steel ball is rolled towards them and collides with the end ball. The ball at the opposite end of the sequence is ejected at a surprisingly high velocity. Optimize the magnet's position for the greatest effect.

### **2. Bright waves**

Illuminate a water tank. When there are waves on the water surface, you can see bright and dark patterns on the bottom of the tank. Study the relation between the waves and the pattern.

### **3. Drawing pins**

A drawing pin (thumbtack) floating on the surface of water near another floating object is subject to an attractive force. Investigate and explain the phenomenon. Is it possible to achieve a repulsive force by a similar mechanism?

### **4. Magnet and coin**

Place a coin vertically on a magnet. Incline the coin relative to the magnet and then release it. The coin may fall down onto the magnet or revert to its vertical position. Study and explain the coin's motion.

### **5. Rocking bottle**

Fill a bottle with some liquid. Lay it down on a horizontal surface and give it a push. The bottle may first move forward and then oscillate before it comes to rest. Investigate the bottle's motion.

Schools wishing to take part should indicate their intentions to me as soon as possible, and certainly by the dates above. If you want to take part, your students can start work right away!

These problems, and other information will be published shortly on the UKYPT website: [www.iypt.org.uk](http://www.iypt.org.uk) You can also find information about the IYPT itself on this site as well.

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