SKFiz, 2010.11.15 19:00 Aula, Hoza 69

1. What is your recommendation for a junior student for how to go about choosing the direction of study, a subject, and advisor?

2. Should one study for PhD in the same place as for Master degree, or should one definitely change a place?

3. When popularizing physics, should one bore the audience with full understanding, or should one go for mystery and excitement by talking about interesting phenomena?

4. Should one excel in study alone or should one try to study in a group?

5. I study math (algebraic topology, advanced algebra) and physics (theory of relativity and quantum mechanics). Some physics students laugh at me that such abstract math is not useful in physics. Some mathematics students laugh at physicists that they miss the skills of abstract thinking. How can a student find a healthy balance?

6. As soon as I get an idea how to solve a problem, I lose interest in calculating a solution and move on to the next problem, but when I force myself to obtain a solution precisely, I often encounter difficulties that I did not expect and I often get stuck. How can one overcome aversion to calculations?

7. What was your goal when you decided to study physics? Have you ever achieved that goal?

8. Should one move on from one small goal to another or work on a big goal?

9. What do you consider the most important problem of contemporary physics?

10. Should one tackle problems that people need to solve, a solution would be very useful, or should one do what one is most interested in without worrying about when one may solve a long-standing problem or if the applications may be useful?

11. Is research in physics necessarily compatible with values of humanity? Should it be compatible?

12. How to teach?
    - least intensive (4-8 h/week) many things (typical mix of courses)
    - workshops or institutes (1-3 weeks) intense
    - research project (purposeful, focused on a problem, intense)

13. Does one need to have a great advisor to do great research?

14. Does one need to be in a good place to obtain good results?

15. Is a good match between a student and an advisor a result of
    a choice made by a student or by the advisor or both?

16. Where to go for graduate studies, USA, best group, good old professor, or a new vigorous one?

17. As a young person, did you work on problems you considered interesting, important, problems that you were good in solving, or problems that somebody gave you to solve?

18. Have you ever had a feeling of burning out, or having doubts about doing physics?

19. Is correlation great teacher-great student mostly due to choices made by professors or by students in how they pair up?

20. In a book "Ideas of Quantum Chemistry" by Lucjan Piela it is stated: "Faculty of Cornell University (USA) was concerned about Wilson's lack of publications. When pressed to publish, he got to work and won the Nobel Prize for renormalization theory." Is it a true story? Should scientists be pressed to publish so that they get results, or the pressure is actually an impediment to productive research?

21. In the epsilon expansion, It appears like that a small departure from dimension 4 takes one close to the truth. How is it possible that a theory with a small epsilon gives physical results and a theory with epsilon = 0 does not?

22. In what ways does high school experience influence performance in university?

23. Do grades during studies indicate if a student is a good candidate to become a scientist?

24. Is it an error to make PhD at the same place one does Masters?

25. What kind of math did you study at Harvard and what was your diploma work about?

26. When and how did you discover your calling and decided to work on physics problems you solved?

27. What do you consider most important in physics?

28. Sometimes I get the feeling that doing science is very easy in comparison with all the things you have to do in order to be able to do your science – search for founds, apply for positions, fill in tons of papers, advertise your work to people who know nothing about it, foresee (or make up) the application of the results of your work before you have even started it... How do you manage to do all that and still do your science in the present world?

How does one find time for serious research when one has to do all kinds of superficial things: search for founds, apply for positions, fill in tons of papers, advertise your work to people who know nothing about it, foresee (or make up) the application of the results of your work before you have even started it...

29. Presently it is not enough just to be curious about the world and intelligent enough to understand something about it in order to be a scientist. It is also not enough to have interesting ideas for your work – you need to have an idea which is solvable in a finite (and preferably short) amount of time and will lead to a result which is interesting enough to be published. How do you look for ideas for your work and how do you judge if they are worth to be pursued?

30. I get the feeling that specialization in physics has gone so far that people working for example in the field of high energy physics speak a completely different language than people working in solid state physics and it is very difficult to communicate ideas between different fields. How do you manage to do that?

31. Is it a good set of rules?
1. Focus on one goal and do not scatter your attention on many small projects;
2. Take advantage of discussion as a universal key to solving problems;
3. Discuss only in small groups if you want to get to the bottom line;
4. Once you learned, teach others because it deepens your own understanding.
5. Teach leaders who will teach their students;
6. Learn subjects logically ordered one after another rather than simultaneously as in a typical curriculum;
7. Discussion is the best tool of illumination?