

**ANSWERS TO COMMENTS ON THE MANUSCRIPT [29]
("BREAKING SPAGHETTI", BELARUSIAN IYPT TEAM)**

Answers to reviewer 1:

Q1. Please give your report some more structure by putting the material into sections. At the same time you could make your introduction slightly more professional.

A1. Tried my best to correct it.

Q2. You have very high uncertainty in your measurements of the critical curvature. Could you elaborate why?

A2. It is explained by the technique of experiment: we have taken several cylinders with different radiuses and curved spaghettis around them. After finding range where less than 100% but more than 0% of spaghettis were broken, critical radius was considered to be in the middle of the range; range itself was used as the error bar. This explanation was also added to the revised article.

Q3. You propose that you are working on the vertical fall exclusively. However, you explain that what actually breaks the spaghetti is bending. How do you think does bending depend on the angle under which the spaghetti impacts the floor?

Q4. How could you extend you analysis in order to also cover the cases between 0 and 90 °inclination when hitting the floor?

A3&4. I've added section "Different angles" with some explanations, qualitative predictions and a small comparative experiment.

Q5. You assume that breaking spaghettis can only be described by probabilities, at the same time you say that random factors influence the breaking process. Why, as a result, is it not possible to describe the conditions, of course with a certain deviation (due to the randomly distributed imperfections of the spaghetti)?

A5. Biggest trouble about it is that this imperfections cause the range for each parameter to expand significantly; as a result, there were only three sets of parameters for which 100% frequency of breaking was achieved. For all other cases it's just impossible to set this range for some parameter, within which the frequency of breaking will be changed from 0% up to 100%. I've also added some explanations on the random imperfections in spaghetti and their influence on the effect in the section "Stochasticity of the phenomenon".

Q6. Please think through your argumentation why mass does not make a difference on the force at the impact once more – you have mass in both expressions for the force.

A6. That's probably because of my not very clear explanation: I was proving that **gravity force** is negligible; mass certainly isn't. I've moved whole this explanation into separate section "Gravity force"; I hope it became more understandable now. Sorry for unclear explanations.

Q7. Please elaborate on why you assume that the speed of spreading of a bending wave is equal to that of sound in the material.

A7. I hadn't assumed it as equal; I had used it only for estimation. Certainly, speed of a bending wave is lower. I've corrected the article, so that now speed of sound is used only as an upper border for the speed of the bending wave.

Answers to reviewer 2:

Q1. This paper has little or no structure. The text is frustrating to read with lots of irrelevant stuff and bad jokes.

A1. I'm very sorry, if you have found some of my jokes bad, and my comments irrelevant. I've tried to remove all such things from the revised article, as well as to improve its structure. Once again, I'm very sorry.

Q2. There are no references for quantities stated.

A2. All quantities were obtained or calculated by ourselves. I've tried to make it clear, from where they are taken, in the revised article.

Q3. No references.

A3. All experiments and pictures are our own; and as for theoretical formulas, most of them are just basic physical or mathematical equations, thereby, not requiring references.

Q4. In figure 1 the presented theory would give a linear relation $R \approx 9 d$ using the stated values for the critical relative stretch.. The line in the figure fitted to experimental values gives something like $R = 40 d$. Yet the author claims that his theoretical model is confirmed.

A4. I'm extremely sorry, this is my mistake: the data about young's modulus, critical relative stretch and critical relative stress were given only for one type of spaghettis; however, we used different spaghettis in our experiments. Now I've added a table with results of tensile-testing of all spaghettis we worked with, and also specified which spaghettis were used for each experiment.

Q5. In the formula below figure 4, the impact force F clearly depends on mass. Thus mass cannot be neglected although the gravitational force is negligible.

A5. That's probably because of my not very clear explanation: I was proving that **gravity force** is negligible; mass certainly isn't. I've moved whole this explanation into separate section "Gravity force"; I hope it became more understandable now. Sorry for unclear explanations.

Q6. The paper is not presented in an acceptable way.

A6. Again, sorry for my a little bit loose style; I've tried my best to improve it in the revised article.