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3 Dinners with the Stakeholders (for the Price of just One)

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Giovanni Garberoglio, Senior Researcher at the FBK-ECT Center * - LISC tells us about his Dinner with the Researcher

After having smelled it for way too long, I finally manage to take a (well deserved?) bite of my hamburger. I hardly finish gulping it down that the organizer signals to conclude: it is time for another table. Too bad – I think – I was just beginning to have some fun. This is going to be a long night, longer than I expected when I volunteered for it. Well, “Invite a researcher to dinner” looked like the perfect opportunity to combine business with pleasure: don’t we work (also) to eat? Additionally, my stipend ultimately comes from other people’s taxes, and I guess my fellow citizens would really like to check what is exactly that they are financing.

Off to the young!
In the first table I join, I meet two very young guys. I don’t resist the temptation and ask how old they are, and why did they decide to participate to this event. One of them is a 19-year old student of Italian Literature, the other is a 17-year old high school student. Yet, both of them declare their interest in science…? let’s begin, then! What would you like to talk about? My question probably throws them off balance for a moment, but they recover quickly. Actually, I did indicate a title for the topic of the evening – The night is (almost) dark – accompanied by a brief abstract where I mentioned that I would have talked about the Golden Age of Astronomy (which, in my very humble opinion, is just the period that we are living in). It is clear that no battle plan survives the encounter with the enemy, and I am happy that I boycotted my plans myself: I think it’s much better when I talk about things that interest my listeners. And they are very interested indeed! We begin with a question about magnetic fields, which paves the way for a conversation about many astronomical objects: aurorae, planets, black holes and how could one use them to produce energy. Well, in that case science quickly becomes science-fiction, but I think it’s ok to let the imagination roam from time to time. However, it was a very clever scientist who first came up with the idea of the Dyson Sphere. And since our heads are “in the stars”, we continue by talking about pulsars, gravitational waves, and a brief description on how we finally manage to observe them. In the meantime, my hamburger and my drink managed to land on the table. I really needed a sip or three to refresh my throat before continuing unabated… until, of course, I am gently reminded that my time is over and they’re waiting for me at another table. I hardly realized that half-an-hour has already passed, and I regret that this conversation had to come to an end. Anyway, I am ready for another adventure.

The impossible? Working on it…

The second table is a bit more crowded, and I meet six new people. I learned my lesson, though, so I take another couple of bites before the conversation begins. I already have a feeling about how this one will end, too. My guests look more like actual stakeholders, and from the very first words I realized that their attitude is also different. I have the fleeting impression that I intimidate them, especially when I ask them if there's anything they'd like to talk about. O maybe I just catched them by surprise. Nevertheless, the first question is quite interesting: "Are tides influenced by the Moon? And does the Moon influence biology, too?". I am familiar with the first question (gravity, relative position between the Moon and the Sun, and so on), but I had to confess my ignorance on the second. Well, I did of course hear about the tradition of sowing according to Moon's phases, and also that getting an haircut in certain periods allegedly improves the health of hairs. I also seemed to recall that the hatching of some turtle's eggs was strictly related to the Moon's phase: it seemed reasonable, but it's probably yet another urban myth. Unfortunately, I am not an expert on all the branches of science, and I did not think that it was the proper setting to suggest that some traditions might actually turn out to be cargo cults.

In principle, it should be easy to check this stuff although I am not sure that anyone ever bothered to do just that. Anyway, there's just a small stretch from moons to planets, and planets do trigger curiosities. We begin with Pluto: somebody heard that it was demoted from planet to something else (I grew up considering him a planet, and to me it is still the case, ok? Also… did you see the wonderful pictures that New Horizons sent us from there?), but the reason for this choice was not clear to my audience. I briefly describe planetary orbits in the Solar system (all planets except Pluto move in the same plane), and I recall a bit of history on how Neptune and Pluto were discovered, throwing in some trivia about space exploration (I notice a certain amount of amazement when I note that one cannot have a phone call with Mars… given the distance, any answer would arrive at least after 8 minutes!) and we finally end up talking about extrasolar planets. Too bad that only a handful of the thousands confirmed so far might be Earth-like. And that's when the tyranny of the clock strikes again. But this time I managed to eat all of my hamburger! A generous sip of water and I am ready for the next adventure.

A friend of my cousin once told him that…

The third table is occupied again by young college students. Two are majoring in humanities, and the third is a mathematician who displays an impressive knowledge about Dark Matter. He would confess later than one of his friends recently defended a Master Thesis on this issue, so he had the chance to learn something. I briefly summarize the topic for the other two guys: there are a lot of astronomical observations showing that the matter we "see" (with light, radio waves and so on) is not sufficient to account for the magnitude of gravitational forces between stars or galaxies. Assuming that Newton's law of universal gravitation is indeed universal, there is a lot of missing stuff. Something like 4 times as much as what is observed. Nobody has the palest idea about what this mass is made of, except the fact that it is not in the form of atoms like all the matter we are familiar with. Lacking a better name, it was called "Dark Matter". Well, truth to be said, we do know something about its properties because we…? simulated universes using computers! This topic is very close to my actual research interest (by the way, I am not an astronomer, did I mention that?) I provide a few more details. Since there is so much Dark Matter, it must have had an important effect on cosmological scales. In particular, its presence did contribute to determine the distribution of mass in the universe, which is called Cosmic Web because of the characteristic filamentary structure. One can then make hypoteses on Dark Matter's property: is it made by "heavy" particles like out atoms, or is it made by light particles like neutrinos? In order to find out the consequences of these assumptions, it is sufficient to teach a computer how to solve the equations governing the evolution of the universe (as you might suspect, it does take some time…) and then calculate how

the universe today would look like for different kinds of Dark Matter. The best Dark Matter model is then chosen by comparing the calculated properties with those observed. This exercise led us to conclude that Dark Matter should be made by “cold” particles, which is lingo for “more like atoms than neutrinos”.

However, the mystery is still very deep. And even at this table, time has flown. Taking a look at my watch, I notice that all of these discussions took much more than the hour-or-so that had been programmed.
Now I understand why my throat is aching so much! But I am still in time to go and finally listen to someone else talking: the conference of a famous Nobel Prize winner was scheduled start in five minutes. I am so curious to see what this guy managed to do with our taxes!

PERMALINK

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