WEBVTT

1
00:00:03.570 --> 00:00:12.750
charlie young: Thank you once again john Paolo. I know you're very busy and thank you for recording it and now doing a live q&a with us, Greg. Would you like to take over, please.

2
00:00:13.080 --> 00:00:14.009
grzegorz madejski: Sure. Can you hear me.

3
00:00:15.150 --> 00:00:15.809
Gianpaolo Carosi: Yes, I'm good.

4
00:00:16.320 --> 00:00:26.340
grzegorz madejski: Yes. Great. Okay. So let's start with one fairly simple question, is this small neutron electric backbone moment, the same thing as the strong CP problem.

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00:00:27.360 --> 00:00:34.410
Gianpaolo Carosi: Yes. Yeah. Who the same manifestation. In fact, one of the ways to think about it, this mystery of why a

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00:00:35.790 --> 00:00:40.080
Gianpaolo Carosi: Neutron has effectively know electric dipole moment was called the strikes up problem.

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00:00:40.140 --> 00:00:40.710
grzegorz madejski: And has been

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00:00:41.070 --> 00:00:47.580
grzegorz madejski: relevant question associated with this is what does a naive estimate of the neutron electric violin moment mean

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00:00:48.030 --> 00:00:54.000
Gianpaolo Carosi: Ah, so that means that you know go actually to my slides on here and share my screen.

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00:00:54.090 --> 00:00:55.110
grzegorz madejski: Here it's like three

11
00:00:55.740 --> 00:00:57.690
Gianpaolo Carosi: Yes, like, three quick

12
00:00:59.910 --> 00:01:00.420
Tips.

13
00:01:03.330 --> 00:01:04.410
Gianpaolo Carosi: To the slides. Okay.

14
00:01:05.130 --> 00:01:05.670
Yes.

15
00:01:09.720 --> 00:01:09.990
Gianpaolo Carosi: Okay.

16
00:01:12.420 --> 00:01:24.930
Gianpaolo Carosi: So the way here. So the neutron electron dipole moment heater and naive Lee. If you know QC didn't have this extra suppression should be up here 10 minus 17

17
00:01:26.070 --> 00:01:38.580
Gianpaolo Carosi: He electron centimeters. So that's just from a corks moving around as we expect. So there's something else in there. That's kind of protecting them and that's what we think is the SEO field.

18
00:01:41.550 --> 00:01:45.300
grzegorz madejski: Okay, the second one is, why does the supernova.

19
00:01:46.800 --> 00:01:50.730
grzegorz madejski: As well as white dwarf cooling said about on accident mass

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00:01:51.660 --> 00:02:03.510
Gianpaolo Carosi: That's very good question. So the first one super number 97 a we have you know a handful of neutrinos that have been measured if the assay on

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00:02:04.740 --> 00:02:13.530
Gianpaolo Carosi: Mass and coupling high enough. Now we're actually an alternative Cooley mechanism during it would enact strongly enough that it would

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00:02:14.670 --> 00:02:29.340
Gianpaolo Carosi: Provide an alternative coping mechanisms for shipping about 1987 day and actually remove some of those neutrinos that we

expect. So the fact that we've seen the neutrinos where we expect puts up an upper limit on how strong the accion couple

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00:02:30.480 --> 00:02:50.850
Gianpaolo Carosi: At the other end of the range. There are limits from what they see is kind of this anomalous cooling so that net says that there's potential axioms that are causing in a similar fashion to 1987 a a cooling of these a supernova. Obviously these are white, white dwarf stars.

24
00:02:53.070 --> 00:03:11.820
grzegorz madejski: Alright, the next one is the bits of early universe type, there is this there's I'm reading it. Exactly. It's written there is that small range where pre inflation and post inflation overlap with an axiom mass at that point, just not give very much information about inflation.

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00:03:13.680 --> 00:03:26.400
Gianpaolo Carosi: So if, if the accion mass is lower than kind of the micro you range that actually would be a pre inflation or accion and that would be something that would be very exciting because

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00:03:26.820 --> 00:03:34.230
Gianpaolo Carosi: That would actually give us a handle on things that are happening in the early universe during inflation when things are being stretched out.

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00:03:36.150 --> 00:03:43.860
Gianpaolo Carosi: You know there's excitement about gravity wave. These BeBo gravity waves that were originally thought to be discovered by bicep.

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00:03:44.520 --> 00:04:02.280
Gianpaolo Carosi: bicep to I had to be retracted do the foreground dust, but the new, you know, CBS for experiments will be looking at this, if gravity waves machine and the CB of that you know from those that will actually rule out some of the very, very light.

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00:04:03.780 --> 00:04:12.810
Gianpaolo Carosi: Mass accion conversely, we discover a very light mass accion that would give us a handle into kind of early and you know inflationary universe.

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00:04:14.940 --> 00:04:22.770
grzegorz madejski: Alright, the next one is, what is the main feature of axial like particle is it happening to firms via gamma five

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00:04:22.800 --> 00:04:24.030
Gianpaolo Carosi: I'm not quite sure if I understand.

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00:04:24.030 --> 00:04:26.400
grzegorz madejski: That. But, you know, maybe, maybe you can follow it. That's apparently

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00:04:26.400 --> 00:04:31.200
Gianpaolo Carosi: Related to that question and think about the little more, but the main difference between

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00:04:31.410 --> 00:04:34.590
Gianpaolo Carosi: And there's a number of different theories. It's very active.

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00:04:36.450 --> 00:04:39.660
Gianpaolo Carosi: Discussion code Genesis is one of the more recent there is

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00:04:40.860 --> 00:04:54.840
Gianpaolo Carosi: The missing difference between the standard kind of QC the accion and the Alps, is, you know, the breaking of the connection between the center breaking scale on the mass. And so by making those three parameters you have more access to the parameter space.

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00:04:55.920 --> 00:05:01.020
Gianpaolo Carosi: Where you lose, you lose the solution to the strong see problem becomes becomes its own entity.

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00:05:02.130 --> 00:05:07.560
grzegorz madejski: Right. Okay. The next one is what is called Genesis so i think thats related to

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00:05:07.770 --> 00:05:17.670
Gianpaolo Carosi: I'm going to defer to the paper reference that's which is very new came out in June. So the references in the slides I'll defer that question.

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00:05:17.970 --> 00:05:26.670
grzegorz madejski: Okay, great. So that will slide 11 in slide 12 Why is X young and not the photon able to go through the wall.

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00:05:28.080 --> 00:05:28.380
Gianpaolo Carosi: Here.

42
00:05:30.660 --> 00:05:31.980
grzegorz madejski: Like 12 yeah

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00:05:32.130 --> 00:05:35.220
Gianpaolo Carosi: So this is effectively a light shining the walls for

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00:05:36.330 --> 00:05:47.280
Gianpaolo Carosi: Prospects so there's actually the whole point of the experiment is that you've done an exquisite job of maintaining the power into its own cavity and leakage of power.

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00:05:47.850 --> 00:05:51.840
Gianpaolo Carosi: Is one of the issues that may be a problem with some of these experiments.

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00:05:52.680 --> 00:06:03.000
Gianpaolo Carosi: Because you have to have, you know, a couple hundred dB of isolation between the two cavities. You're, you're putting a huge amount of power on when one in, and then you're looking for a small number of

47
00:06:03.750 --> 00:06:11.550
Gianpaolo Carosi: Photons appearing in your other one that without the magnetic field would not show up those would be an indication, they're being created by accident.

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00:06:13.800 --> 00:06:28.770
grzegorz madejski: Okay, the next one is relating to slide number 28 and says, Does this figure mean that significant areas of the parameter space permitted for QC the accidents are already excluded.

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00:06:31.230 --> 00:06:47.280
Gianpaolo Carosi: Significant maybe. Yeah, in terms of the sensitivity range, we've effectively ruled out any axons down to kind of the DFS the sensitivity, assuming that the axioms are most of the dark matter Halo.

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00:06:48.180 --> 00:06:52.560
Gianpaolo Carosi: It's possible that we could have an effect this with the light green versus the dark green

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00:06:53.160 --> 00:07:08.940

Gianpaolo Carosi: Shows is those are different models were the dark green is a very conservative model into into the line shape of the accion where's the light green as exclusion of a sharper line shape that's more is closer to embody simulations.

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00:07:10.080 --> 00:07:17.370
Gianpaolo Carosi: There's still a long way to go in terms of the mass range, but we've now gotten to the sensitivity, where we can start really pushing through the various mastering

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00:07:19.650 --> 00:07:25.320
grzegorz madejski: Alright, the next one is very straightforward. What is a bore. That's just the diameter right

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00:07:25.710 --> 00:07:28.980
Gianpaolo Carosi: Or that's just, yeah, that's just the inner bore of the system. Right.

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00:07:29.700 --> 00:07:34.560
grzegorz madejski: Okay, uh, I'm trying to pick up the most important one, since we don't have that much time.

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00:07:36.390 --> 00:07:42.120
grzegorz madejski: Why does Haystack experiment need 9.4 Tesla magnetic field and how do they achieve this.

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00:07:43.170 --> 00:07:46.800
Gianpaolo Carosi: So the, the experiment was really

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00:07:48.000 --> 00:08:00.000
Gianpaolo Carosi: Looking at r&d designs. We always want to get as much magnetic field as we possibly can. But it's always a trade off between how big you can make and how much stored energy there is versus the length scale.

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00:08:01.020 --> 00:08:19.530
Gianpaolo Carosi: Because the haystack magnet or the haystack cavity system was much smaller than the Caribbean max only being around a leader to you can make us a larger magnetic field in that one small region and so that that's set the Skype size scale, higher, higher

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00:08:20.760 --> 00:08:27.390
Gianpaolo Carosi: Current magnets would be much more expensive that that's kind of set the scale for haystack.

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00:08:29.130 --> 00:08:34.170
grzegorz madejski: Okay, the next one is white or copper cavities preferred for action search experiments.

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00:08:34.950 --> 00:08:45.660
Gianpaolo Carosi: Ah, so copper cavities were initially you know refer because you can easily cool them, you know, they have very, very high thermal conductivity

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00:08:46.860 --> 00:09:03.750
Gianpaolo Carosi: They're similar to kind of play strong sized copper accelerator cavities and size. We would love to use superconductors but super good actors when you put them in magnetic field generally become quenched. They become a normal conductor and usually a superconductor magnetic field.

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00:09:04.830 --> 00:09:10.890
Gianpaolo Carosi: The resistive it is much higher than you'd have, you know, in its in its normal state, then you would have for copper

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00:09:11.880 --> 00:09:24.630
Gianpaolo Carosi: There's a lot of R amp D and federal funding to do some r&d we're now to do super nothing films on the sides of cabbies and there's been some evidence that from British accion

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00:09:26.040 --> 00:09:32.070
Gianpaolo Carosi: Detector groups that you can actually maintain the high quality factor using Spinnaker and the magnetic field.

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00:09:33.090 --> 00:09:38.190
Gianpaolo Carosi: Mostly because the, the magnetic field is parallel to the to the spinnaker itself.

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00:09:40.380 --> 00:09:48.990
grzegorz madejski: All right, and maybe the last question. If the axiom is not a fifth force carrier, it would have to be Bosun that doesn't mediate a force.

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00:09:50.490 --> 00:09:51.450
grzegorz madejski: That's like 51

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00:09:51.780 --> 00:10:09.780
Gianpaolo Carosi: Yeah, so that there's limits there in terms of what's this tipping get, um, if the accion exists, it would it would certainly

be a force in general, it's just the reach of that. Sorry. There we go. The reach of that isn't

71
00:10:10.890 --> 00:10:20.460
Gianpaolo Carosi: Is this is a very challenging experiment. So in order to get to the QC axiom parameter space, they're going to do a lot of work to push into that region, but

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00:10:22.020 --> 00:10:35.580
Gianpaolo Carosi: This is something which the accent exist at all, should be detectable at some point. It's very challenging. It would not show that you know necessarily the dark matter, but it would give a big hint that it could be

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00:10:37.170 --> 00:10:42.870
grzegorz madejski: Okay, I suspect that at this point, we should probably finish up. Now, I think we have

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00:10:43.650 --> 00:10:54.870
grzegorz madejski: Pretty much exhausted, most of the questions and we'll send you the remaining questions. So the whole list of questions in in the form of a file. So if you'd be kind enough to put the responses into it as well.

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00:10:54.930 --> 00:11:05.010
Gianpaolo Carosi: Absolutely, yeah, appreciate everybody joining hopefully the if there any other questions, feel free to download the slides. Also, I know there's an image quality issues. So thanks very much.

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00:11:05.550 --> 00:11:16.770
charlie young: Thank you very much. JOHN PAUL I know you have been busy and it's really great that you could join us for this q&a session. Thank you very much. I'll stop the recording now.

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00:11:19.110 --> 00:11:19.410
Gianpaolo Carosi: Thank you.