Comments and suggestions:
• Line 47: “which allow” to be replaced by “that allow” (?) → ok
• Line 49: add a reference to the CMS detector paper where the original pixel detector is described → ok, added.
• Line 56: I would remove “(2023)” now that we know that it is very likely that Run 3 will be extended up to 2024 → ok
• Table 1, FPIX section: I am wondering if it is possible to indicate the correct (and different) z position of the inner and the outer rings in each disk. →
Here are better numbers though FPIX modules’ turbine structure produces a rather complex geometry.
(O)uter disk 1 = +/- 309 cm
(I)nner Disk 1 = +/- 338 cm
O2 = +/- 384 cm
I2 = +/- 413 cm
O3 = +/- 479 cm
I3 = +/- 508 cm

• Line 144: the thickness of the FPIX sensors (300um) should be indicated, too → instead removed thickness here as it is then stated correctly in the sensor section.
• Table 2 caption: is there any reference of a document which describes the CMS implementation of the FLUKA simulation that can be cited together with [6]? To be asked to Sophie Mellows. → asked Sophie Mellows, so far no answer. Reference will be updated if possible.
• Line 154: is the the “size” or is it the “aspect ratio” that matters ? → changed to the latter.
• Line 155-156: it has to be reminded here that the LA play a role for BPIX. There is a risk of duplication with lines 229-239 but IF the interplay between pixel aspect ratio, module orientation and resolution has to be described in lines 154-162, then the role of the LA has to be reminded, too. → removed the sentence about the aspect ratio.
• Line 163-165: is the definition of the local reference frame used anywhere else in the paper? I managed to find it only in the picture of figure 8: is it really needed? → indeed. Has been removed now.
• Line 181: add an hyphen between “irradiation” and “induced” →ok
• Line 185-186: the message in this sentence should be anticipated in lines 155-156 → I think this can be kept here, as the sentence about the aspect ratio is removed.
• Line 239. A “)” is missing. → ok
• Table 3: anything better than “data loss” to describe the dynamic inefficiency? “pixel hit loss”, “pixel hit readout loss”? → Changed to “pixel hit loss”
• Line 282: every time I read “data are discarded” I wonder if it means that also the data of the future L1A’s are lost. Is it the case? If not, can you clarify a bit better? → no, it just means that the data in the buffer are discarded if their timestamp does not match the trigger time stamp. Added “in the corresponding buffer”
• Line 335: I would remove the sentence “This can happen … rates” from here and I would add in line 338 (before “At low rates”) something like: “Since the time stamp buffer is filled more frequently when the occupancy is high, the effect of the spurious signal affects the efficiency when running at high luminosity. → ok
• Line 350: a sentence about the noise reduction should be added, too. → But the noise is mentioned “power lines leads to lower noise and lower cross talk” So I am not sure what you mean.

• Line 404: I think that the concept of "TBM core" has not been introduced yet. It should be added somewhere in lines 360-373 → **Added to 404-405:** The observed rate of TBM cores (two cores per TBM chip) getting blocked in BPIX L1 is about 0.7% per 100 pb−1 of integrated luminosity.

• Line 406: I am wondering if "doing an iteration" is jargon or if it is ok for a paper. → kept for now.
• Line 493: I do not understand the meaning of "twice" in this sentence. Aren't we describing 10 cylces between +17 and -20 C? → fixed.

• Line 510: I understand how CalDel is adjusted with this calibration but I do not understand how Vthrcomp is adjusted. In particular the concept of "center" in line 513 could be clear for CalDel but I am not sure it applies to Vthrcomp. → The Vthrcomp is simply set in a "safe" region, that is well above the noise level. This was somewhat arbitrary, but typically about 20 vcal using abive noise. The sentence is modified to reflect this.

• Line 570: you should add "pulse height (in Vcal unit according to the calibration described before)" → ok

• Line 573: is this sentence still about the calibration with the X-rays? The fact that the pixelto-pixel variation is referred to could indicate that you are referring to the ADC to Vcal calibration with the injected pulse. If, instead, you are referring to the X-ray calibration, is the 15% spread present AFTER the ADC to VCal gain calibration? Or is this spread including also the ADC to VCal calibration spread? → o, we seperate the vcal calibraton using x-rays from the gain calibration using charge injection. These are two different measurements using different methods, one should not mix them. The 15% is the vcal spread, the gain spreads are taken out.

• Figure 15 left: can the vertical scale be expanded to include all the open dots? → yes, fixed.
• Figure 15 right: it looks like its size is slightly different from the one of the left plot. → should be the same.
• Lines 706 and 707: check the consistency with Table 1: some values are slightly different → ok
• Section 4.2: do not forget to comment that the two modules overlap only partly in each blade. → **Replace single sentence on 708-709 with**: The half-disks serve as the cooling isotherms for the sensor modules. One module is mounted on each side of the blades with a small overlap in coverage at the outer edge of the blade with adjacent modules and a larger overlap closer to the beam.
• Line 742: are "the skins" referred to only the one of the rear section? If this is the case, please make it clear. → **Replace (742)**: The skins are 12-ply carbon... with The rear skins are 12-ply carbon...
• Lines 769-770. The sentence "the end flange is … wall" should be moved after line 784 where the whole grounding scheme is described, to complete it. The description of the end flange in lines 765-769 can survive nicely without that sentence. → ok
• Lines 820-821. The statement "then connect to the FED connector" oversimplifies the description of the optical links. It should be said that between the magnet solenoid edge and the FEDs the bundles of 12 fibers are grouped in cables with 8 bundles each. → prefer to not add more details. Instead removed "then connect to the FED connector".
• Line 931. "The CCU" should be complemented with something like "The CCU in charge of that sector" (or anything better than sector). → ok

• Line 944 . Add “THE aluminum flex cables” since those cables were already introduced before → ok
• Figure 28: In the bottom part the circle with “7” is missing and “1” and “2” are not properly placed: they should be before and after the pump that, I think is the circle with the triangle inside and not the square with the diagonal. → ok fixed.
• Figure 31, caption: “from top to bottom” does not help because the geometry of the setup is not described. Moreover “third set” could be replaced with “Ladder 10” (I guess) to make it clearer → yes, fixed.
• Line 1130: add a comma before “and offline” → fixed
• Line 1137: add commas before and after “observed in the pilot system test stand” → ok
• Line 1199: add something to make clearer that “the components” are the “backend components” (power supplies and readout boards). Otherwise it may give the impression we were missing components inside the detector → sentence changed
• Line 1202. Replace “was” with “were” → no, “functionality was checked”
• Lines 1204-1205: no paragraph break here → ok
• Lines 1248: remove “and, later, module surfaces” since the gluing of the modules is described later. → ok
• Line 1262: “are” or “were”? Not sure → “are” as it describes how the system is.
• Lines 1265 and 1266: consider the possibility of using “inner half-rings” and “outer halfrings” since this is what has been used in the rest of the paper. → ok, changed.
• Line 1278: I do not understand what does “any” stand for? → removed
• Line 1289: “bending rails” sounds odd to me. Anything better than “bending”? → changed to “curved”
• Line 1297. I think it is not “adopted”: it should be “adapted” → no this is correct, in the meaning of “being used”
• Both in line 1298 and 1302: if possible make clear that the new sections of pipes and fibers is between the magnet solenoid edge (PP1) and PP0. → ok
• Line 1344 . It should be something like “The position of the detector layers, relatively to the other inactive parts has been measured…” . This is because the position of the detector layers come from the alignment procedure, not from this analysis which has no way to confirm it in an independent way. → ok
• Line 1400. Clarify what we mean by “run” and how long it is. Elsewhere we talked about data taking which lasts “a year” → changed to “data-taking period”
• Line 1436-1437. A suggestion to make clearer why we did not run with lower thresholds:
Add something like “A better understanding of the detector and software improvements developed during the two-years long data taking period eventually showed that…” and replace “during collision data taking” with “toward the end of the collision data taking period in 2018” → ok
• Line 1458: replace “one” with “once” → ok
• Line 1478: replace “larger” with “finer” → ok
• Line 1494: add a comma after “taken” → ok
• Line 1515-1516: my suggestion is to give an idea about the amount of data needed to obtain a satisfactory alignment with collisions. → added a sentence
• Line 1542: check if “fill” is considered as jargon (for example if it is used in other CMS papers) → changed “fill” to “LHC fill cycle”
Line 1555: isn’t “voltage drifts” a bit too vague? Are we talking about DAC settings drifts? Bandgap reference voltage drifts? → Both can drift. How do we seperate the two? I think this must be made vague.

After line 1575. Remind briefly how the HV bias settings evolved in 2017 and 2018 and how much luminosity was integrated. It is important that we inform about our HV settings and since it changed mostly because of the signal amplitude (and we can also refer to the LA optimization) this is the right place to do so. → Well, this was the whole point of dropping the "history" part of the paper and leaving it for the performace paper. If we now include here the whole history of luminosity and bias settings we are back to square one. Here we just make a warning that HV changes might be needed.
Lines 1578 and 1580. We wrote twice that LA has to be measured/monitored. Once it is enough. Instead, you could add that HV setting is optimized also for that (see my comment about line 1575) Modify the sentence, delete the phrase. I do not recall that we ever changed the bias setting just to affect the LA. Usually we increase the bias because of charge collection and than measure its effect on the LA.

• Line 1585: add "track INCIDENCE angles" → ok
• Reference [19]: the paper has been published, eventually. Update the reference → ok, done.
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