Dear Editor,

Thank you for considering our paper. We appreciate referee for the time spent to carefully read our manuscript and write thorough review. We made amendments which hopefully improve the quality of the presentation. Please refer to the blue text to see the corrections in the new version of the paper. The detailed reply for the reviewer is given below.

The authors

Review B

The authors discuss analitical description of polarization state of plasmon-polariton waves generated in a metal-dielectric interface by nonparaxial random beams. Recent reports in the topic are creatively confronted with the classic covariant representation by Fedorov. This makes the work interesting, but the following points should be clarified/corrected:
1. It is not clear whether the presented description of the stochastic field operates within the space-time or the space-frequency domain or both alternatively. This distinction affects interpretation of the "elementary waves" which could mean spatial components of one chosen frequency or spectral components of a broadband source. Both types of waves can be mutually uncorrelated within their own kind or mixed together (that is why Fedorov treated them equally as "incoherent simple waves"), but the principles and modern formal description of these types of incoherence are completely different. I would suggest to use the space-frequency framework explicitly (spectral coherence matrix, spectral degree of polarization, etc.) as in Refs. [6,7,9], not as in [5]. Then it will be obvious how to refer the presented description to polychromatic fields.

We indeed implied space-frequency framework. So, we further apply explicit terms like spectral degree of polarization as it was kindly suggested by the reviewer.

See the changes throughout the text of the manuscript.

2. Fig. 1: Does the "incident wave" represent an exemplary ray of one of many planar wavefronts illuminating the whole surface - or is it a narrow light beam or an optical fiber creating a localized source on the surface?

We suppose that the incident field consists of randomly directed simple (elementary) waves. There is no predefined structure of the incident beam. We deleted some mentioning of incident waves in p. 3. In p. 1 (before Eq. (3)) we wrote about the beam itself.

3. Equation (3) deserve more comment. First, it is not equivalent to eq. (37) in Ref. [13] (no dyadic product in the "natural light" part - why?). Second, it states that the 3D light beam tensor can be decomposed into the sum of tensors describing fully polarized and fully unpolarized field. That is clearly against the basic point made in the introduction of Ref. [6]. On the other hand, the competetive approach presented in [7] (sum of 3 tensors) as a critical response to [6] looks very much like eq. (14) in Ref. [13] by Fedorov. Is there some connection between the approach in Ref. [7] and the representation provided by Fedorov in 1965? And apart from that, if the reference [13] (and [7]?) presents a different concept of the "3D" spectral degree of polarization and yet equations from both works have been applied, then which of the two concepts is actually used in the present paper?

We used rather approach of Ref. [7] than of Ref. [6], because we also separate the fully polarized and fully unpolarized components. However, the tensor (3) is not as general as in Ref. [7]. We consider only three-dimensionally unpolarized light ignoring unpolarized light in two-dimensions. Such a limitation seems quite justified, because exactly 3D-unpolarized light creates unpolarized plasmonic beams (p.1, before Eq. (3)).

4. The formulae for P3 (Eq. (9)) and P2 (on page 3) do not correspond exactly to those in Ref. [6] (missing brackets).

Eq. (9) coincides with that in Ref. [6], but equation for P2 indeed erroneous. Now it is corrected.

5. In Eqs. (8a)-(8d): It is surprising that the z-component does not participate to the total power S0. Its analogue in Ref. [6] (Lambda_0) accounts for all three components.

We chose the Stokes parameters to be similar to the ordinary Stokes parameters. However we see your point and add the third component of the field to S0. In such a form S0 indeed has more sense.

6. The claim that the full 3D description is excessive implies that the out-of-plane parameter S3 in Eq. (8d) is derivable from the parameters S0, S1, S2 and the dielectric-metal interface parameters itself. This, however, has not been shown clearly.

When we talk of excessive 3D description, we mean that the *z*-components of the elementary waves in Eq. (5) are not random. Therefore, instead of considering the general 3D coherence matrix it is better to deal with the 2D matrix (Eq. (6)). In another form, Eq. (5) can be written as Eq. (7) and Eq. (6) as Eq. (10). Thus α in Eq. (7) cannot be treated as independent random quantity.

We added text at the end of p.2.