

Response to the Editor

Dear Editor,

Thank you very much for your careful evaluation of our manuscript and for your constructive comment regarding the interpretation of modulation efficiency behavior in Figure 3. We fully agree that, under realistic operating conditions, instrumental misalignment typically leads to a decrease in modulation efficiency rather than a physical increase.

In the original submission, Figure 3 was intended as a schematic illustration to qualitatively distinguish between idealized and non-ideal interferogram behavior. However, we recognize that the apparent increase in modulation amplitude shown for the real-instrument case could be misinterpreted as a genuine enhancement of modulation efficiency. To address this concern, we have revised the caption of Figure 3 to explicitly clarify that the illustrated increase in modulation amplitude arises from the ZPD-normalized representation and does not correspond to a physical increase in modulation efficiency. The revised caption now clearly states that, in real instruments, misalignment typically results in a reduction of modulation efficiency with increasing optical path difference.

In addition to addressing this specific point, we carefully revised the manuscript to improve sentence consistency and reduce redundancy throughout the text. The reference list was also reviewed in detail. In earlier revised versions, some references did not include all co-authors; in the present revision, all reference entries have been corrected to list the complete set of authors. Duplicate references with identical titles but different citation keys were removed without affecting any in-text citations. Furthermore, DOI information was added for all references where available, and bibliographic metadata were updated accordingly. One reference in Section 3.4 (“True gas cell column amount”) was also replaced to better support the corresponding statement and to improve bibliographic accuracy. All of these changes are editorial in nature and do not affect the scientific content, results, or conclusions of the manuscript.

We are grateful for your guidance, which has helped improve the clarity, accuracy, and technical precision of the paper. We hope that the revised version satisfactorily addresses your comment and meets the journal’s expectations.

Sincerely,
Gezahegn Sufa Daba
(on behalf of the authors)