# Abstract - Identifying crystal candidates for high-speed holographic storage

By Jesper Graungaard Bertelsen

It’s 2025 and today we use photonics in collaboration with electronics. It sets the speeds in terms of the slowest part, electronics, but also requires power when transferring between the two.   
Increasingly more data is being used but we’re about to reach the limit of maximization with electronics. Transferring over to using photonics from end to end, it might have the potential to decrease energy consumption, fastening the speeds while also being able to work in parallel due to multiplexing of light. But when searching for photonic storage online, nothing really comes to scope. Holographic storage seems to be the possibility for photonic storage, and it has been worked on in the last couple of decades, and it’s becoming better and better. Using crystals to store interference patterns one can write, read and erase contents of the crystal. For my design study I will try to discover, what a crystal suitable for high-speed holographic data storage is and if lesser used crystals could be suitable candidates as well. I will be taking the article “Matching for realizing high-speed reading in holographic data storage system” as reference, and I’ll be testing crystal properties using softwares such as Emode photonics.

# References

Jing Xu, Yongkun Lin, Linli Zhong, Yuping Ke, Chen He, Sheng Lin, Dakui Lin, Xiao Lin and Xiaodi Tan, Matching for realizing high-speed reading in holographic data storage system, 2024  
<https://opg.optica.org/oe/fulltext.cfm?uri=oe-32-26-46259&id=565113>

*Similar tests made previously*M.-P. Bernal, H. Coufal, R. K. Grygier, J. A. Hoffnagle, C. M. Jefferson, R. M. Macfarlane, R. M. Shelby, G. T. Sincerbox, P. Wimmer, and G. Wittmann*,* A precision tester for studies of holographic optical storage materials and recording physics, 1996  
<https://opg.optica.org/ao/abstract.cfm?uri=ao-35-14-2360&origin=search>