In this article, recently proposed correspondence between planar MHV amplitudes and light-like Wilson loops in $\mathcal{N} = 4$ super Yang-Mills theory [1] is further investigated at two-loop level. Explicit calculations are carried out in both sides and it is shown that the correspondence holds for 4- and 5-point two-loop amplitudes at an order of $\mathcal{O}(\epsilon)$ up to additive constants, with ϵ being a dimensional regularization parameter. The calculations are also numerically evaluated. The results strongly suggest that the correspondence between MHV amplitudes and Wilson loops is in fact an equality relation. Namely, one may naturally infer from the results that the two quantities are quantum theoretically equivalent, at any loop level and to all orders in ϵ.

References

[1] L. F. Alday, J. M. Maldacena, JHEP **0706**, 064 (2007). [arXiv:0705.0303 [hep-th]].