In this article, thorough studies of NMHV (next-to maximally helicity violating) amplitudes of planar $\mathcal{N} = 4$ super Yang-Mills theory at tree and one-loop levels are carried out. Of particular focus is on superconformal and dual superconformal symmetries of the NMHV amplitudes. (The latter symmetry is recently reported in [1].) Taking several examples, the authors show that the NMHV amplitudes are not completely determined by the two symmetries but by a combination of these with additional requirements arising from analytic properties of the amplitudes. To be more concrete, the requirements come from the absence of spurious singularities and the correct multi-particle singular behavior of the amplitudes. The result suggests the importance of multi-particle information in determining the full symmetry of the scattering amplitudes in general.

References

[1] J. M. Drummond, J. Henn, G. P. Korchemsky and E. Sokatchev, Nucl. Phys. B **828**, 317 (2010) [arXiv:0807.1095 [hep-th]].