The quenched gluon and ghost propagator data published in [Duarte et al. Phys. Rev. D 94, 014502 (2016)] is reanalyzed following the suggestion of [Boucaud et al. Phys. Rev. D 96, 098501 (2017)] to resolve the differences between the infrared data of the simulations. Our results confirm that the procedure works well either for the gluon or for the ghost propagator but not for both propagators simultaneously as the observed deviations in the data follow opposite patterns. Definitive conclusions require improving the determination of the (ratios) of lattice spacings. A simple procedure for the relative calibration of the lattice spacing in lattice simulations is suggested.

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scale are named below as recalibrated propagators. As reference data we take the propagators of the simulation performed using $\beta = 6.0$ and the $80^4$ lattice.

The recalibrated gluon data for the $\beta = 5.7$ and $\beta = 6.3$ can be seen on Fig. 2. For the first (coarser) lattice data we show the infrared data separately from those with $p \geq 1$ GeV. Similar curves could be drawn for the (finer lattice) $\beta = 6.3$ data. A systematic deviation in the scale setting of the same order of magnitude as the statistical errors associated to the lattice spacing settles the differences observed on Fig. 1 both in the infrared and ultraviolet regions.

The resolution of the differences between the gluon propagator data over the full range of momenta provides a way of setting the relative values of the lattice spacing either by identifying a particular momenta or by matching the lattice data for different simulations. A candidate kinematical point being the maximum of the gluon dressing function, see Fig. 3. A naive fit of the data to the Padé approximation $z(p^2 + m_r^2)/(p^4 + m_2p^2 + m_1^2)$ for $p \in [0.5, 1.5]$ GeV, gives $p \sim 0.84$ GeV ($\beta = 5.7$),

$0.85$ GeV ($\beta = 6.0$) and $0.86$ GeV ($\beta = 6.3$) for the maximum of the dressing function. An “exact” determination of $p_{\text{max}}$ demands a detailed and careful analysis.
In what concerns the ghost propagator, a recalibration of the lattice spacing does not change significantly the conclusions reported in [1]. As reported in [1], the 444 data provides the largest $G_R(p^2)$, contrary to the gluon propagator data where it provides the lowest $D_R(p^2)$. The effects of the lattice spacing on the ghost and gluon propagators are in opposite directions. The procedure of [20] does not seem to be able to improve the agreement between simulations simultaneously for both propagators. On Fig. 4 we report the recalibrated ghost data for the coarser lattice ($\beta = 5.7$). Similar curves could be reported for $\beta = 6.3$ and the larger lattice 1284.

In conclusion, our reanalysis of the lattice propagator data published in [1] confirms that the procedure of [20] softens the differences between the lattice gluon data for simulations with various lattice spacings. However, for the ghost propagator, the recipe does not improve the agreement between the lattice data, as the deviations are in the opposite direction of the gluon data. Definitive conclusions concerning the topic discussed here, require a method that provides a good (relative) calibration of the lattice spacing or, equivalently, provide a precise lattice measurement of the beta function. In this sense, a possible method is discussed here, and further work is under development.

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