New modalities for scientific engagement in Africa - the case for computational physics

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Computational physics as a mode of studying the mathematical and physical sciences has grown world-wide over the past two decades, but this trend is yet to fully develop in Africa. The essential ingredients are there for this to happen: increasing internet connectivity, cheaper computing resources and the widespread availability of open source and freeware. The missing ingredients centre on intellectual isolation and the low levels of quality international collaborations. This paper gives a motivation for the importance of developing computational physics at the university undergraduate level, post-graduate level and research levels and gives suggestions on how this may be achieved within the African context. It is argued that students develop a more intuitive feel for the mathematical and physical sciences, that they learn useful, transferable skills that make our graduates well-sought after in the industrial and commercial environments, and that such graduates are better prepared to tackle research problems at the masters and doctoral levels. At the research level, the case of the African School Series on Electronic Structure Methods and Applications will be discussed as a new modality for engaging with African scientists. Research topics in computational physics that are of relevance to Africa are also discussed.