

**The Electromagnetic Field as a Constrained System,**  
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of Craiova, Romania - The known gauge invariance of  
the electromagnetic field, as well as the geometrical  
restrictions imposed by construction, transforms the  
various electromagnetic field configurations  
encountered in accelerators in constrained systems and  
requires supplementary care in the study of these  
configurations. Non-physical degrees of freedom  
appear and the coordinates describing the system are  
not independent. The aim of our work is to provide a  
consistent description of the electromagnetic field in  
the framework of the general theory of the constrained  
systems. Using the example of a toroidal  
configuration, we shall integrate this geometrical  
constraint in the context of the other "internal"  
symmetries. For this configuration we shall deduce a  
real set of coordinates and we shall construct a suitable  
phase space using the BRST rules. The possibility to  
extend the procedure for a arbitrary field configuration  
and for arbitrary (non-canonical) coordinates is pointed  
out.