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The Completion of a C^*-algebra under a locally convex topology

ABSTRACT Let $A_0[\|\cdot\|]$ be a commutative C^*-algebra and τ a locally convex algebra topology on A_0. There are cases, where the topology τ is coarser than the topology induced by $\|\cdot\|$ on A_0. We consider the case where $A_0[\tau]$ has jointly continuous multiplication and denote its completion by $\widetilde{A_0}[\tau]$. Then, $\widetilde{A_0}[\tau]$ is a complete locally convex $*$-algebra containing $A_0[\|\cdot\|]$ as a dense subalgebra. We investigate the structure of $\widetilde{A_0}[\tau]$ obtaining among others a functional calculus on $\widetilde{A_0}[\tau]$ analogous to that of a C^*-algebra.