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ALMA Observations of the IRDC Clump G34.43+00.24 MM3

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We have observed a cluster forming clump (MM3) associated with the infrared dark cloud G34.43+00.24 with the Atacama Large Millimeter/submillimeter Array and the Keck telescope. We have found a young outflow toward the center of this clump in the SiO, CS, and CH₃OH lines. This outflow is likely driven by a protostar embedded in a hot core, which is traced by the CH₃CH₂CN, HCOOCH₃, ¹³CS, and high excitation CH₃OH lines. The size of the hot core is about 800×300 AU in spite of its low mass (<1.1 M_{\odot}), suggesting a high accretion rate or the presence of multiple star system harboring a few hot corinos. The outflow is highly collimated, and the dynamical timescale is estimated to be less than 740 yr. In addition, we have also detected extended emission of SiO, CS, and CH₃OH, which is not associated with the hot core and the outflow. This emission may be related to past star formation activity in the clump. Although G34.43+00.24 MM3 is surrounded by a dark feature in infrared, it has already experienced active formation of low-mass stars in an early stage of clump evolution.