Near-Infrared Counterparts to Chandra X-ray Sources Toward the Galactic Center. II. Discovery of Wolf-Rayet Stars and O Supergiants

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We present new identifications of infrared counterparts to the population of hard X-ray sources near the Galactic center detected by the Chandra X-ray Observatory. We have confirmed 16 new massive stellar counterparts to the X-ray population, including nitrogen-type (WN) and carbon-type (WC) Wolf-Rayet stars, and O supergiants. For the majority of these sources, the X-ray photometry is consistent with thermal emission from plasma having temperatures in the range of kT=1-8 keV or non-thermal emission having power-law indices in the range of -1<gamma<3, and X-ray luminosities in the range of Lx~1e32-1e34 erg/s. Several sources have exhibited X-ray variability of several factors between separate observations. The X-ray properties are not a ubiquitous feature of single massive stars but are typical of massive binaries, in which the high-energy emission is generated by the collision of supersonic winds, or by accretion onto a compact companion. However, the possibility of intrinsic hard X-ray generation from single stars cannot be completely ruled out. The spectral energy distributions of these sources exhibit significant infrared excess, attributable to free-free emission from ionized stellar winds, supplemented by hot dust emission in the case of the WC stars. With the exception of one object located near the outer regions of the Quintuplet cluster, most of the new stars appear isolated or in loose associations. Seven hydrogen-rich WN and O stars are concentrated near the Sagittarius B HII region, while other similar stars and more highly evolved hydrogen-poor WN and WC stars lie scattered within ~50 pc, in projection, of Sagitarrius A West. We discuss various mechanisms capable of generating the observed X-rays and the implications these stars have for massive star formation in the Galaxy's Central Molecular Zone.

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