Really Cool Stars and the Star Formation History at the Galactic Center

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We present $\lambda/\Delta\lambda$ = 550 to 1200 near infrared H and K spectra for a magnitude limited sample of 79 asymptotic giant branch and cool supergiant stars in the central 5 pc of the Galaxy. Using a set of similar spectra obtained for solar neighborhood stars with the same range in $T_{\rm eff}$ and $M_{\rm bol}$ as for the Galactic center (GC) sample as calibrators, we construct the Hertzsprung–Russell diagram for the GC sample. Using an automated maximum likelihood routine, we derive a coarse star formation history of the GC. We find that roughly 75 % of the stars that have formed in the central few pc are older than 5 Gyr. In particular, the best fitting star formation history yields star formation rates in four age bins of 0.01 to 0.10 Gyr, 0.10 to 1.0 Gyr, 1.0 to 5.0 Gyr, and 5 Gyr to 12 Gyr, of $36.4 \pm 13 \times 10^{-4}$ $M_{\odot}$ yr^{-1}, $5.7 \pm 2 \times 10^{-4}$ $M_{\odot}$ yr^{-1}, $5.8 \pm 2 \times 10^{-4}$ $M_{\odot}$ yr^{-1}, and $15.1 \pm 5 \times 10^{-4}$ $M_{\odot}$ yr^{-1}, respectively. We do not include stars less than 10 Myr old which have been the subject of many earlier studies. The GC has been forming stars over the last 100 Myr at a rate roughly two to three times higher than average, though the total mass formed in this recent epoch is less than three percent of the total mass formed over all times.