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JWST/NIRSpec Spectroscopy of Pre-Main Sequence Stars in the Small Magellanic Cloud

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Using JWST/NIRSpec, we studied 20 pre-main sequence (PMS) star candidates previously identified with Hubble photometry in the low-metallicity NGC 346 cluster, the most massive starburst region in the Small Magellanic Cloud. These objects have ages in the range 1-30 Myr. Our spectra show for the first time strong hydrogen recombination lines in the Paschen and Brackets series in the spectra of these sources and reveal mass accretion rates of about 1E-8 Msolar/year for PMS stars as old as 20-30 Myr. These rates are about two orders of magnitude higher than those measured for stars of similar age in the Milky Way. The spectra also reveal prominent H2 ro-vibrational lines, witnessing molecular winds associated with shocks and outflows in the circumstellar discs of all these PMS stars, even those 20-30 Myr old. No such features are seen at comparable ages in Galactic star forming regions. JWST spectroscopy and photometry also reveal NIR excess from these PMS stars, clearly showing that circumstellar discs are still surrounding even the oldest of these PMS objects, providing more time for planets to form and grow than in the Milky Way. We conclude that in these low-metallicity environments, similar to those at high redshift, star and planet formation proceed differently from what we currently know.