Decoding the scatter in the SFR - M* "main-sequence" relation of disk-dominated galaxies: The filling factor and mass-scale of the clumpy component of baryons in parent dark-matter haloes.

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Utilising panchromatic (FUV-submm) and sersic photometry from the GAMA survey we employ a high fidelity radiation transfer analysis to delineate the "main sequence" SFR-M* scaling relation between star formation rate and stellar mass for a mass-complete, morphologically-selected sample of disk-dominated galaxies at the centres of their parent DM haloes at $z < 0.13$. For the first time, we approach the intrinsic scatters in the MS relations in the FUV, NUV and u-bands. Using simple time-dependent gas flow models we model the scatter as the superposition of (i) a component arising from stochasticity in the self-regulated balance between the inflow, outflow, and consumption of gas by star-formation in disks on timescales shorter than the halo infall time and (ii) a small residual component from fluctuations in SFR on cosmological timescales. We use the derived dependency on M* of the short timescale fluctuations in gas inflow to constrain the filling factor and mass-scale of the clumpy component of baryons in the haloes. In addition, we use the measured cosmological component of scatter in SFR on cosmological timescales in conjunction with the predicted scatter in host halo masses to constrain the functional dependencies of SFR on M* and halo mass in the range $10^{11.5} < M_{halo}/M_{solar} < 10^{13}$.