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The modulation spaces quantify the time-frequency concentration of functions and distributions. We relate the modulation spaces, the space BMO of functions with bounded mean oscillation, and the Balian–Low Theorem. The embedding of modulation spaces into VMO (the space of functions of vanishing mean oscillation) is seen to lie behind the essential limitation of the time-frequency localization of Gabor systems that form Riesz bases. We also prove that a type of Balian–Low Theorem holds for Gabor Schauder bases, which raises interesting questions about the convergence of rectangular partial sums of Fourier series in higher dimensions. (Received January 10, 2012)