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*Splitting Madsen-Tillmann Spectra*

We prove that the Madsen-Tillmann spectrum $MT\theta_n := \mathrm{Th}(-\theta_n^*\gamma_{2n} \to BO(2n)\langle n \rangle)$ splits into the sum of spectra $\Sigma^{-2n}MO\langle n \rangle \oplus \Sigma^{\infty-2n}\mathbb{R}P_{2n}^{\infty}$ after Postnikov trunctation $\tau_{\leq \ell}$ for $\ell = \frac{n}{2} - c$. This is achieved by showing the connecting homomorphism $\tau_{\leq \ell}MO\langle n \rangle \to \tau_{\leq \ell}\Sigma^{\infty+1}\mathbb{R}P_{2n}^{\infty}$ is nullhomotopic in this range by applying Adams spectral sequence arguments.

We discuss a number of applications, most prominently the computation of $H_2(B\,\mathrm{Diff}(W_g^{2n}, D^{2n}); \mathbb{Z})$ which is connected to moduli spaces of high dimensional manifolds. This is joint work with Andy Senger.