The Detectability of Departures from the Inflationary Consistency Equation

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abstract We study the detectability, given CMB polarization maps, of departures from the inflationary consistency equation, \( r \equiv T/S \simeq -5n_T \), where \( T \) and \( S \) are the tensor and scalar contributions to the quadrupole variance, respectively. The consistency equation holds if inflation is driven by a slowly-rolling scalar field. Departures can be caused by: 1) higher-order terms in the expansion in slow-roll parameters, 2) quantum loop corrections or 3) multiple fields. Higher-order corrections in the first two slow-roll parameters are undetectably small. Loop corrections are detectable if they are nearly maximal and \( r \gtrsim 0.1 \). Large departures (\(|\Delta n_T| \gtrsim 0.1\)) can be seen if \( r \gtrsim 0.001 \). High angular resolution can be important for detecting non-zero \( r + 5n_T \), even when not important for detecting non-zero \( r \).