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One-loop determinant for massive vector field in large dimension limit

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We derive an expression for the one-loop determinant of the massive vector field in the Anti-de Sitter black brane geometry with large dimension limit. We utilize the Denef, Hartnoll and Sachdev method, which constructs the one-loop determinant from the quasinormal modes of the field. The large dimension limit decouples the equations of motion for different field components, and also selects a specific set of quasinormal modes that contribute to the non-polynomial part of the one-loop determinant. We hope this result can provide some useful information even when the number of dimension D is finite, since it's the leading order contribution when we treat D as a parameter and do an expansion in terms of 1/D.

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