1052-82-61 **Pavel Bleher*** (bleher@math.iupui.edu), Department of Mathematical Sciences, IUPUI, 402 N. Blackford Street, Indianapolis, IN 46202. *Exact solution of the six-vertex model with domain wall boundary conditions. Antiferroelectric phase.*

This is a joint work of the author with Karl Liechty, and it is a continuation of the works of Bleher–Fokin and Bleher–Liechty, in which the large N asymptotics is obtained for the partition function Z_N of the six-vertex model with domain wall boundary conditions in the disordered phase region, the ferroelectric phase region, and on the critical line between these two regions. In the present paper we obtain the large N asymptotics of Z_N in the antiferroelectric phase region, with the weights $a = \sinh(\gamma - t),\ b = \sinh(\gamma + t),\ c = \sinh(2\gamma),\ |t| < \gamma$. We prove that the partition function has the asymptotic behavior $Z_N = C\theta_4(N\omega)F^{N^2}[1 + O(N^{-1})]$ as $N \to \infty$, where $C > 0$ is a constant,

$$F = \frac{\pi \sinh(\gamma - t)\sinh(\gamma + t)\theta_1'(0)}{2\gamma\theta_1(\omega)}, \qquad \omega = \frac{\pi}{2}\left(1 + \frac{t}{\gamma}\right),$$

and $\theta_k(x)$ are the Jacobi theta-functions with the elliptic nome $q = e^{-\pi^2/(2\gamma)}$. The proof is based on the Riemann-Hilbert approach to the underlying discrete orthogonal polynomials. (Received August 17, 2009)