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The intermediate Jacobians of the theta divisors of four-dimensional principally polarized abelian varieties. (English summary)

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Let A be a principally polarized abelian variety of dimension 4 and $\Theta \subset A$ a smooth symmetric theta divisor. The cohomology group $H^3(\Theta, \mathbf{Z})$ contains a rank 10 sublattice K which allows one to define a 5-dimensional complex subtorus, $J(K)$, of the intermediate Jacobian $J(\Theta)$. The authors also define another complex subtorus $J(H) \subset J(\Theta)$ fitting into the exact sequence $0 \to J(K) \to J(H) \to A \to 0$. The complex tori $J(H)$ and $J(K)$ are shown to be abelian varieties. Let $\mathcal{P}$ be the Prym map and $\mathcal{P}^{-1}(A)$ its fibre at A and let $\mathcal{F}$ be the variety parametrizing the family of Prym-embedded curves in Θ. The authors prove the existence of the commutative diagram

$$\begin{array}{ccc} \mathcal{F} & \longrightarrow & J(\Theta) \\ \downarrow & & \downarrow \\ \mathcal{P}^{-1}(A) & \longrightarrow & J(Q) \end{array}$$

$J(Q)$ being the dual abelian variety of $J(K)$; moreover, they prove that the image of $\mathcal{P}^{-1}(A)$ generates $J(Q)$, $\mathcal{F}$ is smooth and the natural map $\mathrm{Alb}(\mathcal{P}^{-1}(A)) \to J(Q)$ is an isomorphism. From these facts they deduce that the image of $\mathcal{F}$ by the Abel-Jacobi map generates $J(H)$.

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