Let $\Gamma^2$ be the 2-dimensional unit torus. We denote by $(z,w) = (e^{i\theta}, e^{i\phi})$ the variables in $\Gamma^2 = \Gamma_z \times \Gamma_w$. For every invariant subspace $M$ in the Hardy spaces $H^2(\Gamma^2)$, let $R_z$ and $R_w$ be multiplication operators on $M$. Mandrekar proved that $R_zR_w^* = R_w^*R_z$ holds if and only if $M = qH^2$ for some inner function $q$.

A closed subspace $N$ of $H^2$ is called backward shift invariant if $T_z^*N \subset N$ and $T_w^*N \subset N$. For a backward shift invariant subspace $N$ in $H^2(\Gamma^2)$, two operators $S_z$ and $S_w$ on $N$ are defined by $S_z = P_NT_zP_N$ and $S_w = P_NT_wP_N$, where $P_N$ is the orthogonal projection from $H^2(\Gamma^2)$ onto $N$. Our theorem is: Let $N$ be a backward shift invariant subspace of $H^2$ and $N \neq H^2$. Then $S_zS_w^* = S_w^*S_z$ on $N$ holds if and only if $N$ has one of the following forms. (i) $N = H^2 \ominus q_1(z)H^2$, (ii) $N = H^2 \ominus q_2(w)H^2$, (iii) $N = (H^2 \ominus q_1(z)H^2) \cap (H^2 \ominus q_2(w)H^2)$, where $q_1(z)$ and $q_2(w)$ are one variable inner functions.

Also we talk about the case: $S_z^nS_w^n = S_w^nS_z^n$. We give a characterization of backward shift invariant subspaces satisfying $S_z^nS_w^* = S_w^nS_z^*$. (Received August 23, 2004)