Supplementary Materials for
“Coherence interpretations of nonlocal quantum correlation based on a quantum eraser”

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In Fig. 1(c), the following output photons are obtained:

$$E_A = \frac{E_0}{\sqrt{2}}(-V_1 e^{i\varphi} + H_2), \tag{S1}$$

$$E_B = \frac{iE_0}{\sqrt{2}}(H_1 e^{i\varphi} + V_2). \tag{S2}$$

After polarizers, Eqs. (S1) and (S2) are written as:

$$E_s = \frac{E_0}{\sqrt{2}}(-V_1 sin\xi e^{i\varphi} + H_2 cos\xi), \tag{S3}$$

$$E_i = \frac{iE_0}{\sqrt{2}}(H_1 cos\theta e^{i\varphi} + V_2 sin\theta), \tag{S4}$$

where the convention of the polarizer's rotation is from the horizontal (+x) axis toward counterclockwise direction. Especially for Eq. (S4), the position of the polarizer should be from the –x axis according to the convention of an observer toward the light. Thus, the locally measured intensities are as follows:

$$I_s = \frac{I_0}{2}(-V_1 sin\xi e^{i\varphi} + H_2 cos\xi)(-V_1 sin\xi e^{-i\varphi} + H_2 cos\xi)$$

$$= \frac{I_0}{2}(1 - sin2\xi cos\varphi), \tag{S5}$$

$$I_i = \frac{I_0}{2}(H_1 cos\theta e^{i\varphi} + V_2 sin\theta)(H_1 cos\theta e^{-i\varphi} + V_2 sin\theta)$$

$$= \frac{I_0}{2}(1 + sin2\theta cos\varphi), \tag{S6}$$

For $\varphi = 0$, the coincident heterodyne detection between two local detectors results in:

$$\langle R_{si}(\tau)\rangle = \langle I_1(t) I_2(t+\tau)\rangle =$$

$$\frac{I_0^2}{4}(-V_1 sin\xi + H_2 cos\xi)(H_1 cos\theta + V_2 sin\theta)(-V_1 sin\xi + H_2 cos\xi)(H_1 cos\theta + V_2 sin\theta),$$

$$= \frac{I_0^2}{4}(V_1 V_2 sin\xi sin\theta + H_1 H_2 cos\xi cos\theta)(c.c.)$$

$$= \frac{I_0^2}{4}\cos^2(\xi - \theta) \tag{S7}$$